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INFORMATION REFERENTS AND PATTERNS IN THE CURRICULUM PLANNING OF CLASSROOM TEACHERS

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Information Referents and Patterns in the Curriculum Planning of Classroom Teachers" submitted by Antoinette Alexander Oberg in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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ABSTRACT

Trends toward decentralization of curriculum decision making in Canada have made it imperative to examine in what manner and with what expertise classroom teachers can address the task of curriculum planning. In this study, classroom curriculum planning was conceptualized as a particular type of problem solving, called "problem finding," in which starting points, strategies, and end results are often uncertain. The intent of the study was to devise a means of investigating the variety of curriculum planning processes used by experienced and prospective classroom teachers.

These processes were investigated in terms of two groups of variables commonly associated with problem solving: characteristics of information search and characteristics of information utlilization. Information search included types of information sources consulted, amount of situational or theoretical information gathered, and patterns evident in the activities, purposes, sources, and kinds of information used during planning processes. The nature of information utilized by subjects and the amount each required were determined primarily by examining written curriculum plans.

Procedures used in this study to describe subjects' curriculum planning processes were the following: (1) a curriculum planning task set in a simulated elementary school classroom was devised and presented to 59 experienced and prospective classroom teachers; (2) subjects were allowed four to five days to prepare written lesson plans appropriate to this setting; (3) subjects then used a computer-assisted instrument developed to guide curriculum planners in retrospective analysis of the information search and utilization aspects of their own curriculum planning processes; (4) subjects' written curriculum plans were collected and analyzed by the researcher.

These procedures and instruments were found to elicit from subjects accurate descriptions of their curriculum planning processes. Examination of planning descriptions revealed that subjects had relied on their own previous experience and store of knowledge more than on any other single source of information. The kind of information with which subjects had most often been concerned was situational information about the pupils for whom their lessons were intended. Few commonly shared planning strategies appeared in subjects' curriculum planning processes.

Examination of subjects' written curriculum plans revealed that subjects used the great majority of the

information they had described gathering during their curriculum planning. Subjects' plans also contained evidence of information which had not been described using the computer instrument. Little relationship was evident between the consistency of plans produced and the planning processes used to produce them.

It was concluded that the traditional linear model for curriculum development did not accurately or usefully represent the curriculum planning carried out by the classroom teachers in this study, and that the problem solving framework provided a more useful and flexible orientation for studying classroom curriculum planning.

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CHAPTER ONE

PROBLEMS IN CURRICULUM PLANNING

The decentralization of curriculum decision making authority which is prevalent across Canada (Torgunrud, 1974) has led to an emphasis on the role of the classroom teacher as a curriculum planner. The apparent stimulus for this trend has been the realization that the individual needs of pupils can be better met by increasing the autonomy of individual schools and teachers. The purpose of this freedom is to encourage schools and teachers to adapt available curriculum materials or to develop their own to meet the needs of particular pupils and to fulfill the goals of the immediate community.

As a result of this trend, the ability of the classroom teacher to make curriculum decisions has become an important criterion of teaching competence. Classroom teachers now have a baffling array of choices. Teachers have opportunities to make innovations both in their traditional decision-making domains, and in formerly predetermined courses of study. Traditionally, the task of the classroom teacher has been to devise a means of implementing well-defined curriculum goals and content using the range of support materials suggested and authorized for that purpose. Since the 1960's, it has become the prerogative of the classroom teacher to decide how much and which parts of each subject area he will emphasize, and to select from the wide variety of print and non-print resources commercially available, those he judges appropriate for teaching the content he has selected. The range of tasks for which the classroom teacher is now responsible is evident in Taba's description (1962) of the teacher's curriculum planning task. According to her, curriculum planning involves diagnosing pupils' cognitive, affective, and psychomotor needs, formulating lesson objectives, selecting and organizing content suitable to those objectives, selecting and organizing appropriate learning experiences, and devising adequate evaluation procedures for each of these activities.

This description of teacher tasks does not imply that the classroom teacher has replaced the professional curriculum developer as the sole author of curriculum materials. On the contrary, provincial programs of study, curriculum guides, resource manuals, and other professionally developed programs and materials are still necessary and useful ingredients in curriculum planning; but they have lost their former status as the definitive sources of curriculum for the classroom. Professionally authored materials have become, along with the needs and interests of particular pupils, the expertise and preferences of the teacher involved, and the goals set by the school or community, one of many inputs into the classroom teacher's curriculum planning.

BACKGROUND OF THE STUDY

Before selecting the particular focus for this study, the status of the classroom teacher as a curriculum planner was examined, and consequences of that view were explored. It seemed clear that the traditional model for curriculum development did not suffice as a source of guidelines for teachers' classroom curriculum planning. A framework based on theories of problem solving, and using theories from the educational foundation areas of philosophy of education, sociology of education, educational psychology, and curriculum, appeared to offer a more viable context within which to investigate classroom curriculum planning. This analysis of current thought and practice was basic to the definition of the study.

The Classroom Teacher as Curriculum Planner

The classroom teacher has been acknowledged to be an important agent in curriculum development (Connelly, 1972, 1975). According to an international study of curriculum decision making (Garry & Connelly, in press), professional curriculum developers and policy makers consider the teacher to be most influential in the curriculum development process. Professional organizations endorse the teacher in this role (Curriculum development for classroom teachers, 1971), as do provincial departments of education (Hawley, Hrabi & Torgunrud, n.d., ca. 1971).

The influence of the teacher on classroom curriculum has been demonstrated indirectly in studies which showed that the nature of the content included in classroom curriculum and the style of content presentation affected pupil achievement (Walker & Schaffarzick, 1974). If, as Lavatelli, Moore, and Kaltsounis (1972) maintained, the classroom teacher "has become the central figure in content matters and in the selection of materials [p.103]," then it is the clasroom teacher who is primarily responsible for the effect resulting from a particular configuration of curriculum content. This assertion is reinforced by Connelly's statement (1972) that "teachers are highly autonomous agents with respect to externally developed materials [p.164]."

Some of the classroom teacher's effect on curriculum materials has been shown to be unintentional. Gallagher (1967) found large variations in different classroom curricula all based on the same Biological Sciences Curriculum Study materials. These differences were deviations from developers' intentions for the materials, and were attributed to teachers' varying interpretations of the materials and to teachers' particular interests.

In spite of the differing degrees of directness and intentionality with which teachers affect classroom curriculum, it has been found in a number of studies that teachers prefer to participate in classroom curriculum decisions. This desire was documented among teachers in Alberta in 1968 by Simpkins, in 1969 by Hawley, and in 1970 by Clarke. All three found that teachers expressed a preference for more voice than they perceived themselves to have in such curriculum matters as determination of course outlines, selection of course content, use of various teaching methods, and selection and ordering of instructional resources. Similar findings were made by Corriveau (1969) in Quebec. Miller (1972) also found a strong desire for participation in curriculum planning among 59 teachers in Alberta, Saskatchewan, Manitoba, and British

Columbia who were actively engaged in curriculum development activities. These teachers were participants in one of a number of local curriculum development projects which have taken place in Canada between 1970 and 1975 under the auspices of the Canada Studies Foundation (*The Canada studies foundation annual report,* 1974). According to Miller's study of 14 of these projects, classroom teachers have demonstrated that they can, given sufficient opportunity, resources, and encouragement, engage in all stages of curriculum development.

The Traditional Model for Curriculum Development

Paradoxically, this flowering of curricular sources and alternatives, while increasing the need for systematic curriculum planning, has also made that task increasingly complex and difficult. The traditional model prescribed for systematic curriculum planning has been the linear approach which was put forth by Charters (1923), and Bobbitt (1924), and later Tyler (1950). According to this model, "the first step in curriculum-making is to decide what specific educational results are to be produced [Bobbitt, 1924, p.32]." According to Charters (1923), "This preliminary statement of aim is a prequisite to both selection and use of succeeding steps, which include casting the objectives in behavior-related terms, selecting appropriate content and learning activities, and, finally, devising ways of evaluating the extent to which the objectives have been fulfilled [p.5]." Unfortunately, this model does not provide a viable framework within which to study actual classroom curriculum development. "For all its successes,...this classical model seems not to have represented very well the most characteristic features of...educational practice [Walker, 1971, p.51]."

This allegation can be based on several counts. First, the traditional model is based on assumptions that may be valid for the professional curriculum developer, but which are not tenable for curriculum development at the classroom level. These are (1) that it is possible for the classroom curriculum developer to identify the behavioral manifestations of intended learnings and to do so preactively; and (2) that the process to be used in identifying appropriate content, learning activities, and evaluative procedures is to examine carefully the alternatives available and to select those that are judged to be the most appropriate for the task at hand. Curiously, the present state of educational knowledge is too meager to admit of the first assumption and too plentiful to permit the second.

For the classroom teacher to define those pupil behaviors indicative of all the specific learnings which he may hope to engender during the course of a school year is a task too miniscule and at the same time too immense to be feasible. Defining broad categories of desired pupil behaviors is a difficult task for a team of professional curriculum developers; the classroom teacher's task of identifying thousands of situation-specific performance behaviors is a task no less complex and immensely more tedious. Moreover, too little is known about the learning process to be able to assert with confidence that any given behavior represents a particular cognitive or affective learning, or to be able to specify with certainty that a given array of intended learnings is comprehensive and consistent with broad, long-term educational goals.

Conversely, in the matter of selecting vehicles for facilitating intended learnings, sophisticated media technologists and professional curriculum developers proffer a plethora of enticing alternatives--so many in fact, that it is virtually impossible to examine them all before making a choice. No longer constrained and directed by a list of authorized materials, the classroom teacher is faced with a formidable task of locating and evaluating a myriad of materials and suggestions without the benefit of centralized intake and screening procedures available to professional curriculum developers. Relative merit is no longer a viable criterion for teacher selection of content, learning activities, and evaluation procedures.

Empirical evidence also challenges the viability of the traditional curriculum development model in the classroom. Contrary to the prescriptions in the linear model, classroom teachers have been found to begin their curriculum planning with a variety of activities other than the definition of objectives, and to follow a variety of routes after the starting point has been selected (Ammons, 1964; McClure, 1965; McClune, 1970; Goodlad and Klein, 1974; Pylypiw, 1974). On the basis of these studies, it appears the traditional model of curriculum development is in some important respects inappropriate for classroom curriculum development, and consequently it is often not used by classroom teachers. The current state of affairs has been aptly summarized by McNeil (1969): "There is little evidence that principles of curriculum and instruction...are significant in shaping the curriculum of the schools [p.293]." This is a modern-day manifestation of a chronic affliction of many professions, the "theory practice gap" (Walton, 1962).

A further difficulty exists with the traditional model of curriculum development. It relates to the question of teacher competence. Within the framework of the linear model, it has been customary to regard pupil outcomes as the ultimate criterion on which to judge teacher competence. A teacher whose pupils were successful was considered a competent teacher, and, by extrapolation, also a competent planner. This ostensibly logical connection however, has failed to materialize. Other factors more salient than teacher behaviors have been identified as primary determinants of pupil achievement; and attempts to isolate teacher behaviors from the welter of independent variables in a teaching situation have had little success. As a consequence, the focus on pupil outcomes has not yielded the desired evaluative data on the worth of various teacher behaviors and decisions (Rosenshine & Furst, 1971; Gage, 1972). This lack of criteria is a serious problem, particularly in view of the increased responsibility for curriculum decisions being placed on the shoulders of the classroom teacher. Clearly, a set of criteria is needed to provide prescriptive and evaluative guidelines for the classroom teacher's curriculum planning task. If traditional theories of curriculum development are not functional for the classroom teacher, then attempts must be made to generate other theories of curriculum which can be operational for curriculum developers at the classroom level. The report of this study describes the preliminary stages of an attempt to identify such a theory of curriculum development by examining classroom teachers' curriculum planning activities.

An Alternative Framework for Curriculum Planning

The starting point for the development of the theoretical framework described in this study was with bodies of theory considered foundational to education, namely, philosophy of education, sociology of education, educational psychology, and curriculum. A theoretical rather than an empirical starting point was used because reports of previous observations of classroom curriculum development (Ammons, 1964; McClure, 1965; McClune, 1970; Goodlad and Klein, 1974; Pylypiw, 1974) had revealed wide diversity and little convergence among classroom practices. Because there appeared in practice no common elements on which to anchor a descriptive framework, it was decided to look to the supposed theoretical underpinnings of practice for a more useful beginning.

Content guidelines. The choice of this particular theoretical starting point was based on the assumption that elements of philosophy of education, sociology of education, educational psychology, and curriculum could provide useful guidelines for teaching and planning practice, in spite of many claims that they did not or had not in the past. It was posited that the reason for the widespread disenchantment with the traditional sources of educational theory and for their apparent lack of impact on teaching practice (Peters, 1968; Rousseau, 1968; McNeil, 1969; Morris and Cock, 1969; Thompson, 1970; Pillet, 1971) was not their inherent irrelevance to practice, but simply their fragmented nature. Each of these areas has tended to be treated and presented separately (LaGrone, 1965). They have not been tied together nor related to the tasks of teaching and planning for teaching.

Based on this assumption of the utility of foundation area theory, a preliminary attempt was made to effect the link between theory and practice by translating descriptive statements from the foundation areas into prescriptive statements for practice and then into statements of implication for teacher behavior. This procedure yielded a set of broadly applicable prescriptive criteria such as, for example, "Classroom teachers should carefully diagnose pupils' previous knowledge and experience so that they can suggest learning tasks at which pupils will be able to succeed." Such translations were intended to make principles of philosophy of education, sociology of education, educational psychology, and curriculum operational for the classroom teacher. It was surmised that understanding generalizations of this type was the intended aim of teacher education programs, and that classroom teachers were expected to grasp if not generate such broadly applicable principles as a result of their preparation, and then to apply them in their particular teaching situations. For the purposes of this study, these operational principles served as criteria for analyzing and comparing the content of classroom teachers' curriculum planning processes and plans. It was maintained that classroom teachers should consider both those principles relevant to the curricular task at hand, and the demands of the particular teaching situation, and that they should then construct plans consistent with those considerations.

Process guidelines. At this point, some broadly applicable procedural framework was required to permit examination of not only the content but also the sequences and patterns of teachers' curriculum planning considerations. Again, in view of the wide variations observed in procedural practices in the classroom, the starting point was with theory. In this case however, the theory which traditionally has been thought to guide curriculum planning procedures was not used, because of its demonstrated inappropriateness, as described in the previous section. Instead, curriculum planning was conceived of as a basically rational and heuristic process, in which information is sought and treated, with some sort of goal in mind but without the restrictions of a predetermined procedure. A common heuristic process, problem solving, was used to provide a framework for examining curriculum development procedures. Briefly, the problem solving paradigm which was chosen involves identifying a problem, gathering information relevant to the problem, and choosing and verifying a solution to the problem. Applied to curriculum development in a very general way, this process would entail identifying some desired instructional objective, gathering and considering both theoretical principles from the foundation areas and practical situation-specific data, and constructing a plan which is intended to contribute to the objective.

The Nature of Planning Processes

Some implications of casting curriculum planning as a problem solving process would seem to be that curriculum planning is deliberate, that instructional objectives must be clearly identified, and that objectives must be prespecified before further planning takes place. However, these are not necessarily true. While any planning process is by nature rational and deliberate, the task of curriculum planning is so immense and so frequent for the classroom teacher than it may often operate at a subconscious or intuitive level. Intuition is sometimes posited as the mysterious mechanism by which everything is suddenly made to fit together (Bruner, 1960); sometimes, it is construed as the habitual performance of an oft-thought-out procedure; and sometimes it connotes uncogitated compulsive behavior. Whatever the interpretation, intuitive processes are often part of the classroom teacher's curriculum planning and have been included in the descriptions provided in this study. An attempt was made to uncover intuitive aspects of teachers' planning processes by examining not only the conscious processes themselves, but also the results of those processes. Teachers' written curriculum plans were analyzed for evidence of considerations that had not been evident as part of teachers' deliberate planning processes.

In the matter of identifying objectives, the same problems which beset the traditional curriculum development paradigm also apply to curriculum development conceived of as problem solving. It is difficult if not impossible to prespecify the exact nature of the desired end product of any intended instruction. For this reason, planning curriculum is appropriately considered not as a familiar "problem to solve," but rather as a "problem to find." These terms were used by Polya (1945) to distinguish between a problem situation in which the nature of the goal was known, and a problem situation in which the nature of the goal was not known. While traditional methods of linear reasoning and logical deduction are appropriate to the first type of problem, alternate methods must be used for the second type of problem. In addressing a "problem to find," the problem solver might posit intermediate goals or subgoals and work toward the uncertain end goal through a series of successive approximations; or he might analyze the problem situation and proceed by filling in perceived gaps; or he might propose a tentative hypothesis to guide his search for a solution. Prespecification of an end goal is not a necessary starting point in solving a "problem to find," as it is in the traditional linear model for curriculum development.

A further implication flows from the characterization of curriculum planning as a "problem to find." Not only is preactive goal specification difficult, but determination of the appropriateness of a particular problem solving procedure is also difficult. The criterion of problem solution is not functional when the problem is "to find" rather than "to solve." Thus, the problem solving procedure used by subjects in this study could possibly be described, but not judged or evaluated. Although the problem solving paradigm did not provide a prescribed sequence of planning procedures against which to compare the curriculum planning processes used by the classroom teachers in this study, it did provide procedural categories to guide the observation and description of their curriculum planning processes. The two major categories used were information search procedures and information utilization procedures. These two types of procedures were described in terms of the kinds, amounts, and sequences of information involved.

Focus of the Present Study

In summary, the theoretical framework used in this study was based on theories from the educational foundation areas of philosophy of education, sociology of education, educational psychology, and curriculum, and on theories of problem solving. The former provided criteria for analyzing the content of classroom teachers' curriculum planning, and the latter yielded categories for describing the processes used in curriculum planning. The examination of teachers' curriculum planning was focused at the classroom level, where the teacher has been shown to be a powerful determiner of curriculum. The investigation was limited to the period before teacher-pupil interaction takes place, because, as Goodlad and Klein (1974) confirmed, curriculum planning is almost impossible to observe in an interactive setting. Furthermore, the relative calm of the preactive setting is conducive to thoughtful decision making (Smith, C., 1963), and is the stage when "the teacher often seems to be engaged in a type of intellectual activity that has many of the formal properties of a problem solving procedure [Jackson, 1968, p.151]."

PURPOSES OF THE STUDY

The purposes of this study were twofold: (1) to develop a theoretical framework for describing and analyzing the curriculum planning processes used by a group of prospective and experienced classroom teachers during their preactive curriculum planning; and (2) to secure descriptions and analyses of these subjects' curriculum planning processes in terms of their information search, their information utilization, and the curriculum plans they produced. The intended measures of information search were the kinds, order, and amounts of information sought; the purposes for which information was gathered; the information sources consulted; and the modes of activity employed. Measures of information utilization desired were the extent to which gathered information was used; the amount of information used but not described; and the number of modifications made to gathered information. The intended use of subjects' curriculum plans was to validate the measures of information search and information utilization, and to provide an indication of the coherence with which information had been combined to form a statement of intention on the part of the classroom teacher-subjects.

STATEMENT OF THE PROBLEMS

The main problem addressed in this study was to develop a viable alternative to the traditional linear curriculum development model. A framework was needed which was sufficiently broad and flexible to encompass a wide variety of curriculum planning strategies, and yet sufficiently structured to permit comparison among individuals' planning procedures.

A component problem faced in this study was to devise a means of making observable the mental processes used in curriculum planning by a group of prospective and experienced classroom teachers. This problem was complicated by the ever-present danger of contaminating the curriculum planning process in the very act of observing it.

A second component problem in this study was to formulate a set of criteria sufficiently comprehensive and yet flexible enough to provide a reliable and useful analysis of the unstructured written curriculum plans which were the product of subjects' curriculum planning processes.

THE RESEARCH QUESTIONS

After a method was devised for securing valid indications of subjects' curriculum planning processes, the following questions provided the framework for describing those processes.

(1) What characterizes the information search strategies used by a group of classroom teachers in a particular instance of curriculum planning?
    (a) How much information is drawn from the teachers' own background knowledge and experience?
    (b) How much information is gathered from sources external to the teachers?
    (c) What strategies are used in gathering and referring to this information?

(2) How does this group of classroom teachers use information in this particular instance of curriculum planning?
    (a) How much information is gathered and not used in the curriculum plans?

(b) How much information is evident in the curriculum plans but is not described by the teachers?

(c) How many modifications are made to the curriculum plans?

(3) What characterizes the plans produced by this group of classroom teachers in this particular instance of curriculum planning?

(a) What levels of internal consistency are evident in the plans?

(b) What levels of inter-lesson consistency are evident in the plans?

(c) What levels of external consistency with the practical information inherent in the planning situation are evident in the plans?

(d) What levels of external consistency with theory relevant to the planning task is evident in the plans?

DEFINITIONS

Classroom curriculum planning--the processes used by a classroom teacher to develop curriculum plans for a particular group of learners in a particular setting. Ideally, curriculum planning includes diagnosing pupil needs; formulating instructional objectives; and generating, selecting, and organizing lesson content, learning activities, resources, and evaluation procedures, though not necessarily in that order. Planning processes themselves are unobservable, although they may be inferred from observable procedural behaviors. They are essentially rational and deliberate, although intuition may be an important factor. "Classroom curriculum planning" is used in this study interchangeably with "teacher curriculum development."

Classroom curriculum plans--the intentions of a classroom teacher for a learner or learners in a particular setting, the means by which these intentions are to be accomplished, and the evaluation procedures to be used. These plans may be explicit or implicit, written or unwritten.

Problem solving--a rational process used to find a solution to a perceived problem. A problem is here broadly defined as the situation which exists whenever the most appropriate method of achieving a desired goal is not immediately evident. In this study, curricular tasks are construed as problems. The broad paradigm for problem solving involves identifying a problem, gathering information relevant to it, generating feasible and appropriate alternative solutions, choosing one of these solutions, and, finally, verifying the solution.

Situational information--specific descriptive data inherent in a planning setting, including facts about a school system, a school, or a classroom; a group of pupils; the curriculum; and the teacher. In this study "situational information" is synonymous with "practical information."

Theoretical information-- broad general principles which can yield prescriptions for a curriculum planning activity, including principles pertaining to the function of schools or the nature of a discipline (philosophical information), to the teaching/learning process (psychological information), to human interaction (sociological information), and to curriculum planning (curricular information).

ASSUMPTIONS

(1) Some planning, whether deliberate or intuitive, is always done by the classroom teacher prior to interacting with pupils.

(2) Curriculum planning is essentially a rational process.

(3) It is possible to reconstruct an earlier planning process by asking a subject to recall and explain that process in relation to the plans which resulted.

DELIMITATIONS

(1) Only that part of curriculum planning which is characteristic of a preactive setting was examined.

(2) Curriculum planning was studied in relation to a single grade level and subject area and in reference to a particular group of pupils.

(3) The study focused on subjects' potential for curriculum planning rather than trying to capture an instance of daily planning performance.

(4) Although teachers' attitudes, general motivation, and philosophical positions are acknowledged to affect their planning decisions, in this study, these attributes were considered peripheral.

LIMITATIONS

(1) The unfamiliar aspects of the computers in the setting in which the reconstruction of curriculum planning processes took place may have affected subjects' performance.

(2) The provision of alternative answers from which subjects were asked to choose in reconstructing their planning processes may have affected subjects' choices.

(3) The amount of time required of subjects by the study and

the amount of time available to subjects due to pressures from other sources may have affected their performance.

SIGNIFICANCE OF THE STUDY

The significance of this study can be discussed at many levels. The topic of curriculum planning is an important one in educational discourse, and the classroom teacher has been acknowledged to play an important role in planning curriculum at the classroom level. Consequently, a need has arisen for further understanding and improvement of classroom curriculum development (Morine, 1973). Schwab (1969), Connelly (1971), and others have suggested that the most promising route toward this goal is through empirically-based descriptive research. This study was devised to test a method of analytic retrospection for describing the curriculum planning of a group of classroom teachers. Combined with a framework based on theories of problem solving, this method should make possible a better understanding of curriculum planning processes.

Furthermore, a potential for improving curriculum planning practices is also inherent in this study. This potential lies in the interpretation of the retrospection occasioned by the computer program, "L-PLAN," as an instance of reflective thinking. In order to describe their planning processes, subjects were asked not only to recall the content of their planning considerations, but also to reflect on the reasons for those considerations. According to Dewey (1933), it is this form of thought which is the most productive, because it enables symbolic representation and conscious action, which are the vehicles of learning. Gagne (1965) made the link with learning more explicit. He maintained that the experience of solving a problem, a type of which is presented in this study, is in itself a form of learning, because it leads to the formation of "higher-order principles that are capable of being generalized in a wide variety of stimulus situations belonging to a given class [p.164]," in this case, in other instances of curriculum planning. Volpe (1974) interpreted the potential of a task such as is presented in this study somewhat differently. He held that reflecting on curriculum planning and other behaviors in terms of relevant theory could "help systematize...thinking, open it to inter-subjective verification, and contribute to the possibility of profiting by experience [no page]." Empirical support for the bases of these assertions is found in studies in which improved teacher performance resulted from (1) practice of the criterion behavior rather than just verbal explanations of it (Levine, 1972); and from (2) discussion analysis linked with practice instead of practice alone (Joyce and Hodges, 1966).

Thus, the significance of the present study lies not only in its anticipated contribution to research in classroom curriculum development, but also in its potential for improving curriculum practice.

ORGANIZATION OF THE THESIS

The following chapter contains a more detailed explanation of the bases and development of the conceptual framework undergirding this study. It is drawn from literature on problem solving and from the educational foundation areas of philosophy of education, sociology of education, educational psychology, and curriculum. Related research in teacher curriculum development is reviewed.

Chapter Three explains the research design used to gather data for the study.

Chapter Four describes the development and use of the three instruments used to gather and analyze the data for the study: the simulated curriculum planning task, the computer program for guiding description and analysis of planning processes, and the criteria for analyzing written curriculum plans.

Chapter Five reports the findings concerning the validity and reliability of the computer instrument and the plan analysis instrument, concerning subjects' curriculum planning processes, and concerning subjects' written curriculum plans.

Chapter Six concludes with a summary of the study, discussion of the findings, conclusions, implications, and recommendations for further research.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND RELATED STUDIES

In this chapter, the interpretation of curriculum planning as a type of problem solving is explained. Some models for problem solving that have been advanced by cognitive theorists, mathematicians, and educationists are presented. A basic problem solving model is extracted, and curriculum planning is related to that model. Having established a theoretical and procedural framework for examining curriculum planning as a type of problem solving, the question of substantive guidelines for curriculum planning processes is addressed. The foundation areas of philosophy of education, sociology of education, educational psychology, and curriculum are identified as sources of information often relevant to problems of curriculum planning.

The task of operationalizing a problem solving model of curriculum planning is then undertaken so that processes used and information referred to can be studied. Examples of research in problem solving are put forth in order to identify some observable and quantifiable indicators of problem solving processes. These process indicators are then discussed in terms of curriculum planning and the present study.

Finally, related studies of curriculum planning, in particular, curriculum planning carried out by classroom teachers, are reported, and the focus of the present study is reiterated in this context.

PROBLEM SOLVING AND CURRICULUM PLANNING

Classroom teacher curriculum planning has been defined in this study as the processes used by classroom teachers in formulating plans or intentions concerning a particular group of pupils, some curriculum content, teaching methods, instructional resources, and evaluation measures. Appropriate constellations of all of these variables are rarely self-evident. Even when an externally prepared or previously made curriculum plan is adopted, some modifications for present circumstances are usually required (Frost & Frost, 1969; Connelly, 1972; Miel, 1973). To the extent that a planning task induces in the planner feelings of doubt, uncertainty, or puzzlement about where and how to proceed, it presents for him a "problem" (Dewey, 1933; Duncker, 1945). A problem is a stimulus for thinking (Dewey, 1933; Duncker, 1945). Acts of searching, inquiring, hunting, or planning undertaken in an attempt to alleviate a problem constitute a kind of thinking called, among other things, "problem solving" (Duncker, 1945; Newell, Shaw & Simon, 1958; Gagne, 1965). The processes used in responding to a curriculum problem or task, that is, the processes used in curriculum planning, can legitimately be classed in this category of thinking. Thus, curriculum planning can be considered as a particular type of problem solving.

MODELS FOR PROBLEM SOLVING

Models for problem solving can be found in a variety of contexts. An early model put forth by Dewey in 1910 was reminiscent of the emphasis on the "scientific method" characteristic of educationists of that time. The term used by Dewey to designate constructive responses to a problem situation was "reflective thinking." The steps Dewey used to describe such thinking were the following:

(1) leaping forward mentally to suggested possible solutions to the problem;

(2) intellectualizing the problem and formulating an

answerable question;

(3) using hypotheses to initiate and guide data collection;

(4) elaborating on the data, reasoning out a solution based on the hypotheses;

(5) testing the hypotheses (Dewey, 1933).

The same model with some elaboration was later advocated by another educationist, Gray (1935). His model was characterized by the following parts:

(1) being sensitive to problems, so that problem solving processes will be stimulated when needed;

(2) knowing problem conditions, that is, gathering data about the problem in order to be able to understand it;

(3) suggesting solutions or hypotheses to guide further solution behavior;

(4) evaluating the hypotheses subjectively by comparing them with problem conditions to determine their workability;

(5) concluding or generalizing, that is, perceiving the "common characteristic of a classification" so as to be able to apply it to future problems and solve them more easily.

The Gestalt theorist Wertheimer and his pupil Duncker took a structural approach to problem solving phenomena and concentrated on perceiving the problem as a whole. They advocated analyzing the conditions of the problem so as to perceive relationships among its elements. According to Wertheimer (1945), "productive thinking" consisted in "envisaging, realizing structural features and structural requirements; proceeding in accordance with, and determined by these requirements [p.190]." As the problem became more clearly defined through successive reformulation or "recentering," so did the final form of its solution. "It is therefore meaningful to say that what is really done in any solution of problems consists in formulating the problem more productively [Duncker, 1945, p.9]."

The mathematician Polya prescribed focus on the parameters of the unknown as well as the known problem elements. According to Polya (1945), exploration of the unknown quantity in a problem was best carried out in four phases:

(1) understanding the problem;
(2) devising a plan for linking the unknown to the data in the problem;
(3) executing the plan, checking each step in the process;
(4) reviewing the completed solution to ensure that it is correct and to perceive other possible uses for

the solution achieved or the method used.

Models of a descriptive nature based on reviews of research on problem solving were put forth by Johnson (1944) and Vinacke (1952). Johnson's model included

(1) orienting to the problem, grasping the heart of the problem and keeping it in focus;

(2) producing relevant material, using directed search models or uncontrolled trial and error or free association mechanisms;

(3) judging or selecting a solution from among alternatives generated during the previous phase.

Vinacke's model of eight years later was almost identical to Johnson's. It included

(1) confronting a problem, which involves a problem situation, perception of the problem, and motivation to overcome the problem;

(2) working toward a solution, which involves using mental processes, and/or manipulating available materials, and/or some verbalizing;

(3) reaching a solution, which results in internal changes within the problem solver as well as in external changes in the environment (Vinacke, 1952).

In an effort to explain more concisely the nature of the mental processes used in problem solving, Newell, Shaw, and Simon (1958) put forth a theory of human problem solving in terms of information processing systems. In their theory, they postulated the operation of three elements during problem solving:

(1) a number of interconnected memories containing symbolized information (presumably representative of a person's store of information);

(2) a number of primitive information processes, which operate on the information in the memories (presumably a person's repertoire of heuristic tactics or logical theorems);

(3) a definite set of rules for combining these processes into whole programs of processing (presumably a person's range of rules for combining tactics or theorems).

The theory of Newell, et al. was developed in relation to computers. The three elements listed above were operationalized and programmed into a computer so that samples of information processing which were considered analogous to human problem solving behavior could be induced and studied.

Miller, Galanter, and Pribram (1960) suggested a more detailed psychological explanation of human information processing mechanisms. They posited the existence of a

Test-Operate-Test-Exit, or TOTE, mechanism which served a function similar to that served by Newell, Shaw, and Simon's "information processes" and "rules." According to Miller, et al. (1960), TOTE units combined hierarchically to form a "Plan," which was defined as "any hierarchical process in the organism that can control the order in which a sequence of operations is to be performed [p.16]." "Plans," in turn, were considered the functional mechanisms which guided problem solving and other intentional behaviors. In problem solving terms, Miller, et al. were concerned with a problem, which they said was contained in a person's "Image" of himself and his world, and the response to a problem, which they called a "Plan." Their model for problem solving could be said to be the TOTE paradigm:

(1) test for incongruity between incoming stimuli and one's "Image," that is, for "a problem;"
(2) operate or respond by forming a "Plan" for gathering information, formulating hypotheses, and so on;
(3) test again for incongruity in order to determine whether or not the problem has been solved;
(4) exit from the loop described by steps (1) to (3) when the problem has been solved.

Although it was presented in a different context, Gagne's theory of problem solving shared with the models of

Miller, et al. (1960) and Newell, et al. (1958) the idea of mental operations which were performed on stored information or on information gathered during the problem solving process. Gagne (1964) described problem solving as a form of learning, which required the following conditions:

(1) the learner must have an identified goal;

(2) he must be able to recall previously learned relevant principles;

(3) he must be able to recombine these relevant principles to form a new principle.

This last step was said to result in "a new higher-order principle that 'solves' the problem and generalizes to an entire class of stimulus situations embodying other problems of the same type [Gagne, 1965, p.165]." Because it represented a capability for a new kind of behavior, this "higher-order principle" was also considered to represent a form of learning (Gagne, 1966).

Guilford, another cognitive theorist, was also interested in the function of problem solving, but in yet another context. He and his colleagues (Merrifield, Guilford, Christensen & Frick, 1962) studied problem solving in relation to the factors of the intellect which had been identified by Guilford earlier (Guilford, 1956, 1959). The model used to guide their problem solving research had five phases:

(1) preparation, in which a problem arises and is recognized;

(2) analysis, in which the problem solver receives both situation-based and goal-based data;

(3) production, in which alternative outcomes and search models are compared and a tentative solution is selected from among the possible pairs;

(4) verification, in which the tentatively chosen solution either is accepted and the problem ends, or is rejected and the process continues;

(5) reapplication, in which the problem solver returns to the previous stage of selecting another tentative solution to the problem (Merrifield, *et al.*, 1962).

THE BASIC MODEL

There are additional models for problem solving which have not been included in the above descriptions. However, the existence of fundamental similarities among the representative models described permits the extraction of a basic problem solving model with the following parts:

(1) identifying the problem;

(2) gathering and processing relevant information to identify or generate alternatives;
(3) using the information to choose a solution;
(4) verifying the solution chosen.

Although this model and those described in the previous section suggest that problem solving occurs in a series of stages, it is important to note that descriptions are given in this form primarily for heuristic purposes and that the stages of problem solving are not distinct (Merrifield, _et al.,_ 1962) nor necessarily linearly related (Newell, _et al.,_ 1958). As Johnson (1944) said, after reviewing literature available by mid-century,

> Problem solving begins with the initial orientation and ends with the closing judgment, but between these bounds almost anything can happen, in any sequence [p.203].

And Duncan (1959), having reviewed problem solving literature between 1946 and 1957, concluded, "Research on problem solving processes reveal[s] very diverse patterns of behavior [p.426]."

These ~~initial~~ disclaimers suggest that although models for problem solving are most often derived from studies of carefully defined, researchable problems presented in well-controlled research settings, the basic model can tolerate a wide range of problem types, information processing strategies, solutions, and verification techniques. In particular, it is suggested that this basic model is sufficiently flexible and non-prescriptive to be useful for describing problems which are not easily defined and controlled, that is, curriculum problems.

In spite of the difficulty of maintaining distinctions between the various parts, the model is discussed in the following subsection in four stages in order to pay particular attention to those aspects of each stage which are important to the interpretation of the model in relation to curriculum planning.

Problem Identification

In the basic model set out in this section, problem identification involves perceiving a disturbance, doubt, perplexity, or uncertainty in a current situation, and then studying its essential elements, namely, the conditions prevailing, the data available, and the nature of the situation which would exist if the problem were solved.

An important characteristic of any problem is its degree of clarity and the consequent ease with which it can be circumscribed and pinpointed. The clarity of the problem affects the clarity of the problem solver's goal. The goal provides a reference point for gathering and processing information; it serves as a guide for selecting a solution; and it functions as a source of criteria for verifying the solution chosen. As Dewey (1933) said, "The nature of the problem fixes the end of thought, and the end controls the process of thinking [p.15]."

In many problem situations however, the nature of the problem and of the desired goal are not clear. Curricular problems are often of this type. The need for dealing with obscure problems is acknowledged, though not widely, in the problem solving literature. Some terms used to distinguish between clear and unclear problems are "problems to solve" and "problems to find." According to Polya's paraphrase of the ancient Greek mathematician, Pappus, "'problems to solve'...aim at establishing true theorems; [and]...'problems to find'...aim at finding the unknown [Polya, 1945, p.142]." Polya himself (1945) identified the parts of a "problem to solve" as the hypothesis and the conclusion, and the parts of a "problem to find" as the unknown, the data, and the conditions or relationships between these two. He said that it was necessary to apprehend these parts in order to understand the problem. Another definition of "problems to find" was given by Mackworth (1965), who said,

> ...problem solving is a choice between existing programs or sets of mental rules--whereas problem finding is the detection of the need for a new program based on a choice between existing and future programs [p.57].

Recommendations for addressing "problems to find" are few. Mackworth (1965) suggested that thought rather than experiment was the appropriate response to a "problem to find." A particular method of thinking about a "problem to find" was offered by Polya (1945). He described a procedure called "analysis," in which the initial step was to

> ...assume what is required to be done as already done, [and then to] inquire from what antecedent the desired result could be derived, [and then to] inquire again what could be the antecedent of that antecedent, and so on, until passing from antecedent to antecedent, we come eventually upon something already known or admittedly true [p.142].

This technique of tentative goal construction is similar to the orientation described by Miller, et al. (1960) for facing "problems to find." In such situations, they suggested that the problem solver "predicted" that a desired goal would eventuate, and then proceeded to work toward that goal as far as possible. They also suggested that it often became necessary to revise the predicted goal to make it more realistic and feasible in terms of the initial problem.

A very similar process was observed by Shulman and his associates (1974) in the initial stages of medical diagnosis carried out by a group of physicians. The doctors in their study were found to advance tentative hypotheses as a substitute for the unknown goal they were trying to identify, and to work on the bases of these hypotheses until they were confirmed, or disproved and revised.

A process related to this technique of tentative goal prediction is the technique of analyzing the problem into subparts and identifying subgoals which can serve to direct solution search more easily. The prevalence of this technique in problem solving research was noted by Johnson (1944).

Focusing exclusively on the problem itself in order to define it more clearly and to identify missing or extraneous parts was another strategy described by Miller, et al. (1960) for "problems to find." This strategy was also an essential feature of Wertheimer's "productive thinking" and was put forth by Wertheimer (1945) as the most appropriate strategy to employ when the desired solution to a problem was unknown.

Information Processing

Information processing usually involves recalling known information and searching for additional information related to the problem, the problem situation, and the desired goal. These data are manipulated so as to see relationships and generate possible alternative solutions. A wide variety of processes can be used to perceive, gather, and manipulate data during problem solving. Some methods of attack that have been observed or hypothesized in the problem solving literature include partial solving (Vinacke, 1952); attacking an analogous problem (Polya, 1945; Newell & Simon, 1963); formulating subproblems (Johnson, 1944; Polya, 1945; Newell & Simon, 1963); predicting (Miller, et al., 1960); omitting certain details (Newell & Simon, 1963); means-ends analysis (Merrifield, et al., 1962); hypothesizing (Dewey, 1933; Gray, 1935; Shulman, 1974); reasoning backwards (Polya, 1945); using a series of varied trials; formulating the problem clearly; surveying initially all aspects of the problem; applying past experience; locating a major aspect of the problem; eliminating sources of error; controlling elements of the problem through variation, isolation, or repetition; visualizing the problem; analyzing the problem into major variables.

The last nine of these processes were investigated by

Burack (1950) for frequency of occurrence and efficacy in the solution of three different types of problems, inductive, deductive, and geometrical. Each problem was carried out by 20 to 25 college level psychology students. Burack found that the processes used and their relative efficacies depended on the nature of the problem being addressed. He also found that some processes were indistinguishable from others in practice and seemed to differ only in label. Therefore, the processes listed above cannot be considered discrete nor mutually exclusive. This contention is supported by Vinacke (1952), who observed that one or more processes can be used either successively or simultaneously during problem solving.

Moreover, it is important to note that there is no necessary relationship between stages and processes of problem solving. It is evident from the discussion in the previous section that the processes listed above are not limited to the information processing stage of problem solving, but may also be used as part of problem identification. As Dewey (1933) pointed out, each process used contributes to some stage of the problem solving process.

It is also important to note that although the processes listed above imply active, directed search for a solution to a problem, other modes of problem solving are possible. One of these alternative modes of addressing a problem is called trial and error, or random search, in which many different pathways from problem to solution are tried at random (Newell & Simon, 1972). Guilford (1959) used the term, "divergent thinking" to describe a related mode of thinking in a more constructive context. Another alternate mode of problem solving is called insight (Wallas, 1926; Wertheimer, 1945), in which a solution suddenly appears in consciousness. This can happen after a period of initial search (Polya, 1945), or after a period of groping (Durkin, 1937), or after a period of incubation or voluntary abstention from conscious thought about the problem (Wallas, 1926). Wallas (1926) described the period of incubation as subconscious thought. Claparede (1934) used a similar term in identifying the locus of thought-regulating mechanisms. Claparede referred to hypothesis formation as occurring at an unconscious level. Those who have characterized problem solving or curriculum planning as partly creative (Mackworth, 1965; Maier, 1970; Davies, 1971) have also implied the involvement of the subconscious (Neisser, 1963).

The importance of these intuitive and subconscious aspects of problem solving is acknowledged. Gagne (1966) pointed out that successful problem solvers often cannot and, he added, need not, bring their problem solving processes to the level of verbalization. Polya (1945), Bruner (1960), and Skemp (1971) also acknowledged the role of intuition in problem solving. Polya (1945) admitted its use along with more formal methods for problem verification, but Bruner (1960) and Skemp (1971) insisted on the importance of analytic verification. As Bruner (1960) said,

> The complementary nature of intuitive and analytic methods should, we think, be recognized. Through intuitive thinking the individual may often arrive at solutions to problems which he would not achieve at all, or at best more slowly, through analytic thinking. Once achieved by intuitive methods, they should if possible be checked by analytic methods...[p.58]

These recommendations seem particularly relevant to teachers addressing curriculum problems. The professionalism expected of classroom teachers implies the necessity of acting only with full awareness of the source and implcations of considerations made. Suggestions of deliberate heuristic devices which are particularly appropriate to "problems, to find," such as curriculum problems follow.

Heuristic devices for "problem finding." The procedure advocated by Polya (1945) for attacking a "problem to find" was the procedure of "regressive reasoning." This process begins with "analysis," as described in the previous section, and is complemented with "synthesis," in which

> ...reversing the process, we start from the point which we reached last of all in the analysis, and go on making derivations until, retracing our steps, we finally succeed in arriving at what is required [p.142].

This procedure seems analogous to what has more recently been called "task analysis" (Gagne, 1965; Davies, 1971). A similar process of working backwards from a posited goal to a present situation in order to solve a difficult problem was mentioned by Raup, Axtelle, Benne, and Smith (1950), Johnson (1944), Duncker (1945), Newell and Simon (1963), and Merrifield, Guilford, Christensen, and Frick (1962). Examples of the use of this procedure to simplify complex problems were documented by Hayes (1966). He found that working backwards was used in 25% of the 60 problem solving instances he studied.

Another process which has proven useful in "problem finding" is the use of tentative hypotheses. The medical diagnosticians observed by Shulman (1974) were found to use tentative hypotheses not only as part of compensating for a difficult-to-identify problem, but also to guide their search for information related to the problem. The hypotheses were used as criteria for determining the usefulness of information sought and for determining the direction and extent of future search.

Another orientation useful for addressing "problems to find" is toward the problem itself. Continued focus on the relationships among parts of the problem, as advocated by Wertheimer (1945), can serve not only to clarify the problem but also to guide the search for missing parts. As with the previous heuristic methods mentioned for "problem finding," this technique can be seen as a continuation of a method adopted during the initial stages of problem identification and can be considered to contribute to all aspects of "problem finding" simultaneously.

Some heuristic techniques proposed for problem solving are also potentially useful for "problem finding." These include omitting aspects of the problem in order to simplify its appearance (Newell & Simon, 1963), or attacking a parallel problem which is easier to resolve (Polya, 1945; Newell & Simon, 1963).

Solution Choice

Regardless of the type of problem being addressed, choosing a solution involves selecting one of the alternatives generated or perceived in relation to the problem. This aspect of problem solving is inextricably linked to the phase of information processing. Durkin (1937) has characterized solutions as immediate, in which solution has been reached with no intervening steps between problem and solution; gradual, in which the goal has been achieved after a succession of minimally-understood manipulations; steady, in which manipulations have been carried out with full understanding; or sudden, in which the solution has occurred after a succession of initial activities with intermediate steps omitted. However, these characteristics are actually more applicable to the previous stage of information processing than they are to the stage of solution choice (Vinacke, 1952). Polya (1945) indicated the ambivalent nature of choosing a solution when he said, "...the main achievement of a problem is to conceive the idea of a plan [p.8]." Similarly, in curriculum planning, solution choice is often embedded in information processing. Arriving at a solution to a curriculum problem is not necessarily equivalent to writing out a curriculum plan: the plan may have been arrived at piecemeal, adopted in varying proportions from previous plans or externally-prepared materials, and written down only partially or not at all.

Solution Verification

Verifying the solution to a problem entails two different kinds of processes: checking to ensure that the solution chosen resolves the problem; and reviewing the processes used to reach the solution in order to perceive their potential usefulness for other problem situations.

The first of these processes implies the need for some validation criteria. Solutions to "problems to solve" can be validated by virtue of their form, for example, syllogistic reasoning or mathematical proof (Wason & Johnson-Laird, 1968), or by "laboratory experiment, controlled observation, historical investigation" or some other form of implementation (Gray, 1935, p.355). Solutions to "problems to find," on the other hand, are considered difficult if not impossible to verify accurately (Gray, 1935; Wason & Johnson-Laird, 1968). Many curriculum problems would seem to fall into this latter category. Clearly, some criteria other than external form or the results of implementation are needed to validate solutions to curriculum problems. Criteria which focus on the processes used in curriculum planning and their results in the form of a curriculum plan are proposed in the following major section of this chapter.

The second aspect of solution verification, in which processes used are reviewed for future use, is significant for the following reasons. First, the review can be thought of as bringing the processes used to the level of consciousness recommended by Bruner (1960) and Skemp (1971) and demanded by the professional status of the classroom teacher. Second, according to Dewey (1933), Polya (1945), and Gagne (1965), review of problem solving procedures leads to an increase in problem solving ability. Not only are solutions previously achieved available for use in succeeding problems (Dewey, 1933; Polya, 1945; Berlyne, 1965), but the higher-order principle acquired as a result of successful problem solving increases facility in carrying out a variety of problem solving procedures (Gagne, 1965).

Summary

The foregoing descriptions have indicated that a wide range of problem types, information processing strategies, solutions, and verification procedures can be usefully related within the framework of the basic problem solving model. In particular, the confounding effects of an unclear problem were described. This type of problem was called a "problem to find," in contrast to a "problem to solve." Strategies suggested in the literature which were applicable to this sort of problem were related, and the role played by "insight" was acknowledged.

CURRICULUM PLANNING AS A TYPE OF PROBLEM SOLVING

The analogy between classroom curriculum planning and the foregoing discussions of problem solving and problem finding is relatively easy to draw. As Fattu (1965) said,

> A teacher facing a classroom has an extremely large range of possible situations to cope with. What he chooses to do depends, in large measure, on what he sees as his task. The task then becomes the problem to be solved. Any educational activity involves goals, pupils, content, facilities, and organizational structure. The teacher combines these ingredients in a way compatible with his perception of the task at hand. Skill in acting, or solving the problem, depends upon command of the processes that are useful in attaining various goals [p.77].

The situation facing the classroom teacher is, therefore, equivalent in many respects to a problem solving task. Curriculum tasks represent problems to be identified; many different kinds of relevant information are available for consideration; a solution in the form of a curriculum plan is required; and some method of validating the plan is usually desirable.

Many curriculum problems, however, are of the particular sort referred to as "problems to find." This is because curriculum tasks are typically difficult to define at the classroom level. There are at least four factors which contribute to this difficulty. One aspect of this difficulty appears in the translation of externally-set broad curriculum goals into subgoals sufficiently specific to guide teacher behavior in the classroom. As Leese, Frasure, and Johnson (1961) said, "The great gap in curriculum...is in the translation of high-sounding phrases and convincing abstractions into positive, first-hand experiences [p.42]." The amount of freedom permitted the classroom teacher in curriculum matters also contributes to the complexity of the teacher's task of identifying objectives. "...[T]he real maker of curriculum, the decider of decisions, the answerer of questions, is the teacher in the classroom after the door is closed [Curriculum development for classroom teachers, 1971, p.4]." This statement reflects the fact that curriculum objectives are not unalterably predetermined for the classroom teacher. On the contrary, it is the teacher's prerogative, and consequently his responsibility, to accept or reject specific preset objectives, or to formulate his own.

Another factor which complicates the identification of curriculum problems is the large quantity of data potentially relevant to any given curriculum task. This data explosion seems partly a function of the teacher's increased freedom to make curriculum decisions, and partly a function of the complexity of curriculum problems. The teacher now has the freedom to consider a wide array of curricular alternatives, but is still admonished to cater to the individual needs of pupils. A fourth factor compounding the difficulty of defining objectives is the reciprocal relationship between means and ends in curriculum (Schwab, 1969; Lawrence, 1969; Henderson & Lanier, 1973). For any given curriculum goal, it is difficult to know which means are most appropriate. Moreover, the first step taken by the teacher toward implementing a particular curriculum goal may have the effect of making a different goal more appropriate; and hopefully it will have the effect of altering the learner's initial state of readiness and thus will change the nature of the original problem. In the words of Wick (1972),

> For in practical situations...ends-in-view are always being modified in reciprocal interplay with the means that happen to be available and with shifting priorities among competing aims; and the unrepeatable uniqueness of what is to be done precludes our being at all sure how all the contributing factors will join to affect the outcome--or our even being sure what they all are [p.40].

In this context, Macdonald (1965) and Doll (1972) maintained that curriculum goals cannot be known until after the problem has been resolved. Not only is it difficult to predefine relevant curriculum goals, but it is often equally difficult to recognize the achievement of intended goals because they are often masked by multiple outcomes. Thus, for the classroom teacher, curriculum tasks can be interpreted not only as problems, but as "problems to find."

Strategies for Curriculum Problem Solving

The analogy between curriculum planning and problem finding continues into a discussion of strategies useful for initial clarification of obscure problems. Suggestions made in reference to "problems to find" seem equally applicable to curriculum problems. One of these was Wertheimer's recommendation (1945) to focus on the problem situation in an attempt to identify relationships and clarify missing elements. In curriculum planning, when a missing element or learner need is identified, it can then function as a "predicted" goal (Miller, et al., 1960), or as a tentative hypothesis (Shulman, 1974). Alternatively, a series of subgoals consistent with an overall curriculum goal can be used to guide curriculum planning. This latter technique is akin to the familiar curricular task of identifying a series of instructional objectives.

Further strategies found in the literature for gathering and processing information about a "problem to find" suggest general paradigms but few specific procedures. Some of these strategies include focusing on the problem (Wertheimer, 1945), addressing a similar problem (Polya, 1945), or reasoning backwards (Polya, 1945), eliminating some difficult aspects of the problem (Newell, Shaw & Simon, 1960), and using tentative hypotheses (Shulman, 1974). When curriculum tasks are interpreted as "problems to find," the traditional characterization of curriculum planning as a set of procedures for selection of curriculum content and learning experiences from among available alternatives becomes incongruous. Sequence has not been identified as a significant factor in studies of problem solving (Johnson, 1944; Gagne, 1966), nor in studies of decision making (Einhorn, 1969). Selection becomes important in problem solving only after alternatives have been generated. As Maier (1960) pointed out,

> Decision-making implies a number of alternatives, whereas in problem solving the alternatives must be created. Thus, problem solving involves both choice behavior and the finding or creating of alternatives [p.445].

The pertinence of these comments to curriculum planning is evident. The need to adapt any externally-developed curriculum to the requirements of a particular group of learners (Frost & Frost, 1969; Connelly, 1972;

Miel, 1973) implies the generation of curricular alternatives by the teacher. In addition, the sheer quantity of information which bears on any curriculum problem makes identification and systematic selection of alternatives inefficient, if not impossible. Under such conditions, heuristic devices (Miller, et al., 1960) and techniques of satisficing (Jepsen & Dilley, 1974) become more important than techniques of selecting.

Solution Verification in Curriculum Problem Solving

Solutions reached in both curriculum planning and "problem finding" are difficult to verify. In curriculum planning, the solution to a problem is typically a curriculum plan. There are at least three different ways to verify a curriculum plan. They are analogous to the verification methods suggested above for a problem solution. They include (1) implementing the plan and observing the results; (2) submitting the plan to the scrutiny of "expert planners"; or (3) substantiating the bases on which the plan was developed (Turner & Fattu, 1960a).

The first of these criteria is of dubious value for the curriculum planner as well as for the "problem finder," because it is not yet possible to demonstrate a reliable relationship between teacher behavior, especially planning behavior, and pupil learning (Rosenshine & Furst, 1971; Gage, 1972). The second criterion is essentially circular (Fattu, 1965). Identification of "expert planners" implies the use of some criteria of "expertness" in planning, which is precisely the measure lacking.

The third alternative would seem the most promising. A note should be made here of the distinction between validation according to the form or procedure of solution finding, and validation according to the bases used in finding a solution. As Gray (1935) and Wason and Johnson-Laird (1968) noted, the former is not applicable to "problems to find" (nor, consequently, to curriculum problems), because there are no preferred procedures for "problem finding" (nor curriculum planning). The latter, however, has been operationalized by Turner and Fattu (1960a) for application to curriculum plans. Drawing on the work of Bruner, Goodnow, and Austin (1956), Turner and Fattu (1960a) identified the appropriate bases for curriculum planning as the information inherent in the problem situation and information drawn from relevant accepted theory. They maintained that a curriculum plan could be considered valid if it were consistent with both these kinds of information.

INFORMATION REFERENTS

In problem solving and in curriculum planning, the primary task is to gather information pertinent to the problem being addressed. In order to determine what information is pertinent in any given case, it is helpful to identify the nature of potentially useful information referents.

Kinds of Information

The distinction made by Turner and Pattu (1960a) between situational and theoretical information is also found in literature related to problem solving. In Polya's model for problem solving (1945), a requirement for understanding the problem was understanding the particular data and conditions associated with the problem; this refers to situational information. A requirement for devising a plan to solve the problem was knowledge of the subject area; this refers to theoretical information. In their problem solving model, Merrifield, *et al.* (1962) used the terms, "situation-based" and "goal-based" data to make a similar dintinction. Dewey (1916, 1933) referred to the ingredients of problem solving as "data" or "facts," and "ideas." The former supplied considerations of the specific difficulty at hand, and the latter were creative excursions beyond the given data, presumably in directions suggested by theory related to the problem.

The importance of situational information to problem solving is apparent. As Neisser (1963) pointed out, "Problem solving, no matter how elegant, always involves...a response to environmental demands [p.2]." The utility of theoretical information may, however, require some substantiation. Schwab (1971) said, "The strength and value of theory lie in its generality, system, and economy [p.494]." The spirit of this statement was endorsed by Johnson (1944), Gagne (1964, 1965, 1966), and Bruner (1964). Bruner (1964) maintained that "[t]he generalization is about the only economical method there is for coping with multiplicity...[and] a theory is about the most practical thing you can have [p.192]." Smith (1963), in reporting on educational research and the preparation of teachers, said, "It is only in relation to theory that a fact has value [p.17]." Volpe (1974) argued that theory was the tool that enabled student teachers to learn from experience and to adapt to new situations. Huenecke (1970) provided empirical support for these statements. In a study of 21 intermediate grade teachers, she found positive correlations between subjects' knowledge of curriculum theory and their levels of performance in writing objectives and questioning pupils according to Bloom's taxonomy.

Information Referents for Curriculum Planning

Although the particular pieces of theoretical or situational information which will be relevant to any given curriculum problem cannot be predicted, it is possible to identify several subcategories of each kind of information which could be considered useful in curriculum planning.

In attempting to formulate theories useful for teachers, Gage (1964) relied primarily on theories of learning, which are psychological theories. Ovans (1970) mentioned theories of sociology. Bruner (1963) drew on theories of epistemology, which can be called philosophical, as well as on sociological and psychological theories. Henchey (1969) maintained that educational theory was drawn from philosophical, psychological, historical, sociological, or economic theory. Beauchamp (1961) included history, psychology, sociology, and philosophy as the bases for curriculum theory. As is evident from these lists, the types of theoretical information most often acknowledged as potentially relevant for curriculum planning are philosophical, sociological, and psychological. A fourth type of theoretical information, which often subsumes elements of the other three, is curricular. These four foundation areas constitute the theoretical component of almost all teacher education programs in Canada (Wees, 1974). In brief, the aspects of each of these four areas of theory which are relevant to curriculum planning might be described as follows:

philosophy--principles of the functions of schools in society and value orientations represented in the schools;

sociology--principles of peer interaction, the social setting, and cultural and environmental influences on learners;

psychology--principles of learning, and child growth and development;

curriculum--principles of lesson planning, organizing pupils and resources for learning, teacher role.

Similarly, subcategories of situational information generally pertinent to curriculum problems can be identified. They include

pupils--their previous learnings, interests, abilities, level of socialization, peer relationships;

support facilities--community, parents, school, equipment, instructional resources, space, time, scheduling;

curriculum content--official prescriptions, desired lessons, available background material;

teacher--expertise, preferences, role, values.

These categories can be considered as situational equivalents of the types of theory identified as relevant to curriculum planning. The first category of situational information listed above can be labelled "philosophical," the second "sociological" and "psychological," and the third and fourth "curricular."

Relationship Between Theoretical and Situational Information in Curriculum Planning

It is not sufficient simply to identify subcategories of theoretical and situational information potentially relevant to curriculum problems. These do not reveal "facts" and "ideas" pertaining to a given curriculum problem. The next step would be to list those principles and facts which might comprise those subcategories. While lists of factual data relevant to any given curriculum problem must be compiled in relation to each specific problem, lists of theoretical principles are more general and can be compiled independently of any particular curriculum problem. Many such lists of theoretical principles have been compiled, perhaps the most extensive being those of Watson (1960), Seagoe (1970), and Hosford (1973). However, this step is still insufficient because, as Smith (1963) pointed out, knowledge of general educational principles and specific teaching methods does not automatically carry with it the ability to use those principles and methods. Evidence of the failure to combine general theoretical information and specific situational information in curriculum planning was found by Aspy (1972). In 50 elementary classroom teachers studied, Aspy found little correlation between subjects' knowledge of learning theory and classroom behavior.

The next step would be the translation of descriptive theoretical principles into prescriptive statements related to teaching tasks. The need for this step has been identified by Henchey (1969), Ovans (1970), Hilliard (1971), and Gage (1972). The difference between descriptive and prescriptive theory, as outlined by Clements (1962), is that the former seeks to generate knowledge in order to make observed phenomena intelligible, while the latter applies rather than seeks knowledge in order to prescribe what ought to be.

Prescriptive theory in the subcategories identified above would facilitate the identification of appropriate curriculum objectives; that is, it would contribute to the problem identification stage of curriculum problem solving. However, the gap between problem identification and problem solution still is not closed. The classroom teacher is still faced with the intermediate task of gathering and processing relevant information in order to generate alternatives and finally arrive at a defensible plan of action or solution.

An important feature of the information processing involved in this task would seem to be the derivation of implications for teaching behavior from, or conversely, the application of, relevant prescriptive theory in the context of the problem at hand. This skill to translate and apply general principles to particular problems has been referred to in the context of teaching as "applicative knowledge" (Broudy, Smith & Burnett, 1964; Smith, B.O., 1969). Broudy, *et al.* (1964) maintained that this was the type of skill most useful to the professional. This skill has also been identified in a variety of other contexts as an essential element of problem solving. Wertheimer (1945) stressed "reorganization" of past experience; Duncker (1945) spoke of "re-centering"; Gagne (1964) referred to "nonreproductive" thought; and Maier (1930) studied the "restructuring" of past experience.

Large-scale efforts at translating prescriptive theory into statements of implication for teacher behavior have been made by educators. Some recent examples are the works of Seagoe (1970), Biehler (1971), and Gage and Berliner (1975). These are potentially valuable sources for teacher curriculum planners. However, their existence does not obviate the need for problem solving skills on the part of the classroom teacher, for the following reason. Usable theory relevant to the problem at hand is only one kind of information necessary for problem solution. The other is the data inherent in the problem situation. The need for both kinds of information is paramount. Principles of learning formerly considered immutable have been found to be highly situation-dependent (Seligman, 1970; McKeachie, 1974); and situational data have been said to have meaning only in relation to theory (Smith, C., 1963).

PROCESS INDICATORS

In order for investigators to make problem solving processes researchable, it has been necessary to identify observable indicators for each stage of the processes being studied. This is a difficult task because problem solving is an internal mental process, the components of which are not readily observable. Much of the research on problem solving has avoided this difficulty by focusing on personality or environmental correlates of problem solving behavior rather than on characteristics of the process itself. Thus, guidelines for describing planning processes are relatively few. However, some indicators of problem solving processes can be derived from studies of problem solving. In this section, these studies are briefly described, and indicators for the present study are identified.

Studies of Problem Solving

Corman (1957) studied the effects of varying kinds and amounts of information available to 255 grade 12 problem solvers during conceptual and mathematical problem solving tasks. He distinguished between two kinds of data: information about the principle underlying the task and information about a rule or procedure for solving the problem. He also identified two types of tasks corresponding to these kinds of data: tasks in which the criterion for solution was a statement of the principle underlying the problem, and tasks in which the criterion was simply solution of the problem. Corman found that the type of information most helpful during problem solving varied with the nature of the problem solving task. Information not directly related to the task being addressed did not help or hinder task achievement, whereas information related to the task facilitated problem solution. However, Corman found that the quantity of information given was a less salient factor than was the explicitness of the information given.

Glaser, Damrin, and Gardner (1954) focused on a different aspect of information-handling during problem solving as demonstrated by trouble-shooters in the field of electronics. They developed a technique for monitoring the sequence in which these professional problem solvers used information. This technique involved labelling a set of information items relevant to the problem solving task and then recording the order in which each item of information was used by the subjects.

Using Glaser's labelling device, Rimoldi (1955) studied not only the sequence but also the amount and kind of information used by practicing doctors and advanced medical students in medical diagnoses and chemical analyses.

In another series of studies of complex equipment trouble-shooting, Fattu and associates (1954) and later Fattu (1956) analyzed protocols of problem solving behavior for the kind, amount, and sequence of information handled. They calculated the amount of time used by subjects, the efficiency with which information was gathered, and the adequacy of the solution chosen. In relating these studies to later studies of the problem solving processes of classroom teachers, Fattu (1965) suggested the following as important variables on which to focus: (1) time involved in solving the problem; (2) amount of information a subject requires beyond that necessary and sufficient to solve the problem; (3) number of errors made; (4) number of revisions of previous responses made; (5) position of corrections in the sequence of the subject's responses; (6) number of relevant hypotheses which the subject can devise; and (7) strategy used in constructing categories.

Pruitt (1957), Roberts (1960), and Worley (1960) focused on the amount of information sought by college student subjects in decision making and concept formation tasks. They varied the task conditions, for example, time allowed, incentive provided, previous success or failure, and they noted attendant changes in the quantity of information subjects gathered before committing themsleves to a decision.

Another group of researchers attempted to describe not only amounts, kinds, and sequences of information gathered for problem solving, but also strategies used to find a solution to a problem. Bruner, Goodnow and Austin (1956) in _A study of thinking_ identified three ideal strategies which might be used by subjects in handling isolated pieces of descriptive information to attain a predetermined concept. These were called "successive scanning," "conservative focusing," and "focus gambling." Each of these strategies described the criteria subjects employed in deciding what information to seek and whether to accept or reject a piece of information when found. Bruner et al. found that subjects' performance could usefully be described in the context of these methods.

Mosher (1962) carried out a similar study of information use in concept formation by children and posited two information utilization stragegies. The first of these was called "constraint seeking," in which subjects successively narrowed the field of possible solutions to the problem. The second stragegy was labelled "hypothesis scanning," in which subjects suggested a series of unrelated hypotheses until the correct one was found. Mosher found that his subjects ranged along a continuum between these two strategies.

Buswell and Kersh (1956) also attempted to discover patterns in problem solving. Their starting point however, was empirical observation rather than a theoretical construct. In contrast to the studies of Bruner et al. and Mosher, Buswell and Kersh found that most subjects used trial and error type procedures rather than more systematic, coherent modes of attack. There were however, some common patterns of information-handling amomg those subjects who arrived at correct solutions to the problem, but even these patterns varied somewhat across subjects.

John (1957) reported the results of a study carried out by John and Miller (1957) in which a wide range of factors was measured in an attempt to identify solution-finding patterns used by a random selection of subjects in response to a circuitry problem with a finite set of elements and relationships, and with a prespecified correct answer. They monitored three groups of variables: (1) information search, defined mainly as the quantity and sufficiency of information sought; (2) information utilization, defined mainly as the prevalence of analytic or synthetic modes of combining information; and (3) work habits, defined mainly as the time used, non-linearity of information search, and cues requested.

Information utlilzation was the focus of a series of studies carried out by Maier and his associates (Maier, Julius & Thurber, 1967; Maier & Burke, 1968; Maier & Thurber, 1968; Maier, Thurber & Janzen 1968; Maier, Thurber & Julius, 1968). They studied a story-writing task which could be considered a "problem finding" task, and found great variation among individual subjects' patterns of information utilization.

From these studies, it is possible to identify the following variables as useful indicators of problem solving processes: amounts, kinds, and sequence of information sought, strategies used in seeking information, and utilization of information in the final solution. These variables and two others were operationalized for the purposes of the present study in the manner described in the following section.

The Study of Curriculum Planning

In order to gather an indication of the amounts, kinds, and sequence of information sought for curriculum planning, categories of information must be established. As identified above, situational and theoretical kinds of information can serve as two broad categories of information pertinent to problem solving and curriculum planning, and these categories can be divided into smaller subcategories based on the areas foundational to curriculum planning. Strategies used in seeking information can be described according to patterns evident in the amounts, kinds, and sequences of information sought for planning; and the mental processes involved in using these strategies can sometimes be inferred from comparison of the nature of the curriculum plans produced with the nature of the search for information which contributed to the plans. Examination of curriculum plans can also provide data on the characteristics of information utilization. The concept of consistency as processes: amounts, kinds, and sequence of information sought, strategies used in seeking information, and utilization of information in the final solution. These variables and two others were operationalized for the purposes of the present study in the manner described in the following section.

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In addition to these indicators, identification of the particular purpose for which each piece of information was sought seems particularly appropriate to "problems to find," such as curriculum problems, in which the problem itself and appropriate solutions are not predefined. In many of the problem solving studies cited above, researchers could infer the purposes of information search because they knew the correct answer to the problem being addressed. In a study of curriculum planning, this information is not available to the researcher. Identification of the purpose of information search is thus a useful addition to the list of process indicators given above.

Another useful variable to identify in a study of curriculum planning processes is the source of the information gathered. Potential sources of situational information or "data" identified by Dewey (1916) included memory, observation, reading, and communication. Johnson (1944) identified potential sources of theoretical information as the problem solver himself and his past experience, the fund of accumulated knowledge, and other people.

The Present Study

In the present study, characteristics of information search and utilization have been selected as the main indicators used to describe samples of classroom teachers' curriculum planning. As in the studies mentioned above, information search has here been characterized by the kind, amount, and order of information sought. To facilitate this description, task relevant data were differentiated into two kinds: situational and theoretical. Each of these subcategories was subdivided into smaller categories based on educational foundation areas to make the description more specific. Information utilization was described according to the quantity of information sought and used, sought and not used, or not sought but used in the solution to the planning problem.

The data from this study were also examined for identifiable patterns of information search by subjects. In addition, the modes of activity engaged in by subjects during the gathering and processing of information were recorded. In the present study, the immediate short-range purpose for which the problem solver sought each piece of information has also been identified and recorded. Using these indicators, a description was provided of the curriculum planning processes employed by a group of experienced and prospective classroom teachers.

RELATED STUDIES

Studies of classroom teachers' curriculum planning skills are relatively few. The most extensive was a series of experiments reported between 1960 and 1967 by Turner and his colleagues at the Institute of Educational Research at Indiana University. In their early work, these researchers began with four propositions: (1) that teaching is a form of problem solving behavior, (2) that the problem solving skills of the teacher are acquired through training and experience, (3) that these problem solving skills may be measured by teacher performance on simulated teaching tasks, and (4) that the performance of teachers on these simulated teaching tasks is related to teacher success in the classroom (Turner & Fattu, 1960b, 1961).

Based on these four propositions, Wade (1960, 1961) developed a set of problem-type teaching tasks in reading. Test items included recordings of children's voices, and paper and pencil tasks. They were intended to assess skills in solving curriculum problems. The test required skills in (1) selecting reading materials at the instructional level of individual children, (2) grouping children on the criterion of oral reading accuracy, (3) judging relative improvement in reading over a three-month period, (4) recognizing the relative reading difficulty level of educational materials for elementary school children, (5) diagnosing phonetic errors, (6) diagnosing errors in structural analysis, and (7) perceiving similarities between instructional reading exercises. Wade (1960, 1961) then attempted to correlate the reading problems test scores with two other measures: years of subjects' teaching experience, and pupils' gain scores on mathematics achievement tests. Using 176 grade two to grade five teachers of all ages and amounts of experience, 89 student teachers who had completed 16 weeks of practice teaching, and 97 undergraduate education students with no teaching experience, he found that years of teaching experience were positively related to test performance, but only up to a point, and that pupil gain scores were also positively related to teacher test performance, but were affected by other intervening variables as well. Further tests of internal consistency of the reading problems test revealed that some items were more powerful than others, but that all items constituted valid measures of problem solving proficiency on reading tasks.

In a similar study, Turner (1960) devised a set of arithmetic teaching problems which he attempted to validate as a measure of teacher problem solving proficiency in the teaching of arithmetic. The arithmetic problems focused on skill in (1) relating arithmetic materials to objectives, (2) diagnosing pupil difficulties in arithmetic, (3) elaborating meanings of fundamental operations, and (4) ordering arithmetic problems according to their difficulty level for pupils (Turner & Fattu, 1961). Each task was expected to require from four to fifteen decisions or responses on the part of the subject and can therefore be considered a typically complex curriculum problem. Turner (1960) then proceeded to investigate whether or not these arithmetic problems reflected differences in teachers' area of specialization, amounts of teaching experience, and various demographic measures. Using 136 experienced, 195 prospective, and 41 non-elementary school teachers as subjects, Turner found that the mathematics problem tasks differentiated among teachers and non-teachers only slightly, and that differences in teacher performance on these tasks were accounted for primarily by differences in training and professional experience. The most salient characteristic of good problem solvers was found to be IQ; attitudes were not related to problem solving performance. In this study, Turner also found that the relationship between proficiency in reading tasks and proficiency in arithmetic tasks was minimal for experienced teachers and even less among inexperienced teachers.

After the sets of reading and arithmetic problem tasks were developed, the focus of these studies seems to have shifted away from problem solving as a process toward correlates of problem solving performance. In a follow-up of his 1960 study, Turner (1961) posited that those elements in a teachers' background which influenced the oportunities he had had to acquire responses instrumental in problem solving would have a significant effect on performance on the arithmetic problem solving test. Comparing groups of undergraduate education students, graduate education students, and teachers from the field, Turner found that this was indeed the case, that number and recency of mathematics methods courses, practice teaching, type of training institution attended, and amount of teaching experience (up to a limit) all correlated in the expected direction with problem solving performance.

In 1963, Turner, White, Quinn and Smith reported a series of three studies of teachers' problem solving skills. In the first, Turner investigated the concurrent validity of the mathematics task instrument developed in the earlier studies on two criterion variables: supervisor ratings of approximately 60 teacher-subjects, and pupil mathematics achievement on the Iowa Basic Skills battery. He obtained supervisor ratings and scores on the mathematics teaching tasks for 59 teachers of grades three to six, and mathematics achievement scores for 150 pupils at the end of their grade four and again in the middle of their grade five years. He found that teachers who were rated highly by their supervisors also scored high on task performance and that the pupils of these high-scoring teachers also scored higher on tests of mathematics achievement than did other pupils.

In the second of these studies, White investigated the power of the mathematics and reading teaching tasks combined with the Minnesota Teacher Attitude Inventory in predicting the mobility of beginning elementary classroom teachers. He administered the teaching tasks and the MTAI to a group of education students at the end of their period of teacher preparation, and then followed up on the mobility patterns of 61 of them at the end of their first year of teaching. He found that the most mobile teachers scored low on both the mathematics and reading tasks but high on the MTAI. This latter unexpected score was attributed to "reality shock."

The last of these three studies, by Quinn and Smith, compared scores of 142 graduate students in elementary mathematics on the intermediate grades mathematics teaching tasks with the same subjects' scores on tests of block design, measuring problem solving speed and accuracy, problem solving strategies, and method of beginning problem solving tasks. The only significant differences found between high and low scorers on the mathematics tasks were on measures of speed and accuracy on the block designs. High scorers on the teaching tasks solved the block design problems faster and more efficiently. Overall, Quinn and Smith found that both high and low scorers as identified by the mathematics tasks used the same problem solving strategies and techniques; high scorers simply used them faster and more efficiently.

In later studies, Turner (1965, 1967) continued to focus on correlates of problem solving performance, in particular, on teachers' personal-social characteristics and characteristics of the teaching setting. The importance of these Indiana studies for the present study is that they were based on the premise that certain curriculum planning skills are equivalent to problem solving skills, and they established that teachers' problem solving performance is an important and measurable skill (Flanders & Simon, 1969).

A study of institutional level curriculum planning done by elementary school classroom teachers was made by McClure (1965). He analyzed the planning procedures engaged in over one year by three groups of faculty at the

University of California at Los Angeles University Elementary School: an early childhood group of eight teachers, a lower elementary group of 12 teachers, and an upper elementary group of eight teachers. The focus of the study was on objective-setting. McClure was interested in how these groups of teachers developed educational objectives, which problem solving tasks they engaged in, and what institutional objectives they produced. Teachers' group planning procedures were observed and analyzed according to the following categories: time spent discussing curriculum sources, such as society, the learner, funded knowledge; amount of attention paid to personal values and psychological theories; extent to which an attempt was made to justify chosen objectives; and time given to procedural matters. Problem solving tasks were categorized according to the Bales Interaction Process Analysis instrument. Quality of objectives produced was judged on measures of precision, significance, and attainability.

McClure found that the early childhood group outperformed the other two groups in all three areas. This group paid more heed than did the other two groups to the three data sources for curriculum and succeeded best in relating general statements about children from the literature to information about children presently in their classrooms. The early childhood group also spent more time validating their objectives and did so in a more consistent manner that did the other two groups. On amount of time spent justifying their decisions, the early childhood group scored highest; and on time spent on extraneous and procedural matters they scored lowest. The problem solving tasks engaged in by these three teacher groups were categorized according to the Bales Interaction Process Analysis instrument. The three groups did not differ significantly on amounts and kinds of tasks performed, but the early childhood group showed a higher social-emotional participation level than did the other two groups.

Although the early childhood group outscored the others on all three measures of the quality of objectives produced, their objectives also lacked operational definition of content, behaviors, learning opportunities, and evaluation devices. These teachers were able to produce acceptable institutional level goals, but they apparently had difficulty in translating these to concrete, instructional level objectives. This suggests that attention to traditional methods of objective-setting is not sufficient to produce viable curriculum plans.

Another study of objective-setting at the institutional level was carried out by Ammons (1964). She operationalized models for curriculum development found in the works of Tyler (1950) and Jensen (1950), and then examined sets of objectives formulated by school systems for congruence with these recommended models. She also investigated the effect of congruence and incongruence with prescribed curriculum development models on the quality of the objectives produced.

Ammons gathered data on the processes used to formulate objectives in 77 school systems and she compiled lists of objectives set by these systems. These objectives were then evaluated by classroom teachers and school boards on the criteria of precision of objectives for selecting learning activities and evaluation techniques, consistency of the objectives, and teachers' estimation of the desirability of the objectives. Ammons found that school systems rarely used systematic or recommended processes in developing objectives, and that there was no relationship between the processes used to develop objectives and teachers' estimate of their worth. In partial explanation of these findings, Ammons judged that teachers' evaluations of curriculum objectives were not accurate or reliable. However, Ammons' rescoring of the objectives on the adopted criteria of worthwhileness failed to reveal a statistical relationship between the processes and the products of institutional curriculum development.

Miller (1972) also analyzed curriculum development practices in relation to principles of curriculum development extracted from the literature. His subjects were 59 teachers who had participated for one year in 14 different local curriculum development projects which were part of a five-year undertaking sponsored across Canada by the Canada Studies Foundation. Miller constructed a set of non-leading questions which were intended to reflect the following 10 principles of curriculum development:

> Curriculum development by classroom teachers may proceed effectively if
>
> (1) the teachers participate in every phase of the planning;
>
> (2) the teachers work in an atmosphere of cooperation, permissiveness, and equality;
>
> (3) the teachers have the essentials of curriculum development--time, money and facilities;
>
> (4) the teachers select a limited program for local development and avoid elaborate, comprehensive programs;
>
> (5) the teachers give attention to specific goals and appropriate materials, content, and teaching strategies;
>
> (6) the teachers employ the methods of professional researchers to study current literature, available materials, and other curriculum projects, and thus acquire a research point of view;
>
> (7) the teachers utilize the services of education consultants, university scholars, professional laymen, and other resource persons;
>
> (8) the teachers utilize a central, coordinating body to unify their scattered efforts, and to assist each other;

(9) the teachers develop good public relations with their supervisors, other teachers, and laymen;

(10) the teachers conduct a program of continuous evaluation of their work.

Miller validated the results of his questionnaire with a sample of taped interviews and direct observations. He found that the teachers he studied implemented to a considerable degree each of the 10 principles. Principles least effectively implemented were numbers (3), (8), and (9). Teacher-subjects felt they lacked sufficient released time for their curriculum development activities; they felt the information network among project teams was insufficient; and they did not consider it important to establish good relations with non-project teachers or with laymen. Principles (5) and (10), referring respectively to goal-setting and evaluation, were perceived as very important by the subjects, but also as the most difficult of the 10 principles to fulfill.

Procedures similar to those used by Miller (1972) were used by McClune (1970) to identify and classify elements of classroom teacher lesson planning. McClune used the literature on curriculum development to develop a preliminary analytical framework for describing lesson planning. He also gathered data on lesson planning practices from 43 elementary school teachers to validate the framework. A questionnaire on lesson planning practices was then devised and administered to 47 additional elementary school teachers. These questionnaire results were, in turn, validated with data from the lesson plans and taped interviews with 18 of the 47 teacher-subjects.

The framework developed by McClune had the following elements: (1) data sources--the learner and learning, the teacher and his professional competencies, the institutional decisions, societal sources, and human knowledge sources; (2) formulating instructional objectives; (3) the uses of instructional objectives; (4) selecting and organizing content; (5) selecting and organizing learning opportunities; (6) evaluation; and (7) the form of written plans. Using this framework, McClune was able to classify all the planning practices described by the teachers in his study.

McClune identified six major points of difference between the curriculum development literature and teachers' lesson planning practices: (1) the nature of the processes used by teachers--the methods and form of lesson plans--were different from those prescribed in the literature; (2) the kinds of information used by teachers to make specific decisions were primarily institutional decisions and textbooks; (3) the amount of emphasis given by teachers to certain kinds of data, mainly instructional resources, was greater than was suggested in the literature; (4) priorities teachers gave to some tasks, for example, objectives, was less than prescribed; (5) relationships teachers perceived among various planning elements were not extensive, for example, objectives were used to guide evaluation procedures, but not to determine content or learning activities; and (6) the inclusiveness of the planning tasks performed by teachers was less than suggested in the literature.

In another study, Gardner (1971) also investigated certain aspects of teachers' lesson planning. He interviewed 15 elementary and 15 secondary school teachers to identify their needs during unit planning, the people they consulted, and the additional unavailable help they required. Subjects' responses to the interviews were analyzed according to seven basic steps of planning extracted from the curriculum development literature: (1) determining student needs; (2) determining student interests; (3) setting objectives; (4) selecting curriculum content; (5) devising teaching methods; (6) selecting instructional materials; and (7) developing evaluation procedures.

Gardner found that his subjects' needs in curriculum planning were primarily in the area of instructional materials. Subjects needed less help in determining curriculum content and teaching methodologies, and least help in identifying student needs or devising evaluation procedures. The average number of persons consulted by each subject during unit planning was eight. These persons were most often principals or their assistants, fellow grade teachers, curriculum workers, or librarians. The average number of consultants required beyond those available was 2.5 consultants. Additional consultation was desired with subject area specialists and fellow teachers. Overall, Gardner concluded,

> The classroom teacher who employs the unit approach makes his own final decisions and he turns to other professionals who are usually within the system for help [p.118].

Jeffares (1973) undertook a detailed content analysis of the lesson plans of 21 intermediate level elementary school social studies teachers in order to discover what elements influenced teachers' curriculum decisions, what teachers thought about prescribed curriculum and related decision making responsibilities, and how teachers' belief systems influenced their curriculum decision making.

Jeffares found six categories which influenced teachers' curriculum decisions, in the following order of importance: (1) instructional resources; (2) curriculum elements (considerations about objectives); (3) student characteristics; (4) teacher characteristics; (5) instructional procedures; and (6) evaluation procedures. He also found that subjects modified externally prepared curriculum, especially when it had only broadly stated goals. Subjects' belief systems were also found to influence perceptions of the curriculum decision making process and the nature of curriculum plans developed.

Pylypiw (1974) studied the classroom curriculum planning processes of 46 elementary school social studies teachers in order to describe the patterns of curriculum development they used and to identify the factors which influenced their curriculum decisions. Pylypiw was most interested in where curriculum decision making occurred within a general model of teaching which consisted of a starting point, a preactive phase, an interactive phase, and a postactive phase. In spite of an extensive body of literature prescribing the contrary, Pylypiw found that slightly fewer than half of the 46 elementary school social studies teachers he interviewed made curriculum decisions preactively. Most of these teachers made decisions about learning objectives and instructional procedures during the interactive and/or postactive stages of their teaching.

Pylypiw found that the most important factor influencing classroom curriculum decisions was the teacher's personal background and value system. The next most powerful influences were instructional resources available, and student needs, interests and experience. Provincial guides and situational factors were also perceived as influential by the teachers in his study.

A study of the information used by classroom teachers in planning for individualized instruction is currently being undertaken by Shore (1974, 1975). Sixteen elementary and 16 secondary classroom teachers have been interviewed to ascertain the extent to which they are aware of and can articulate the learning style characteristics of individual pupils in their classes. Subjects' responses to questions asking for descriptions of eight individual pupils and for prescriptions for those pupils' learning environments have been examined for relative emphasis on (1) the quality of work done by the student; (2) content preferences; and (3) the process by which the student works. Preliminary findings have indicated that subjects pay considerable attention to students' learning styles when describing students, and even more when prescribing desirable learning environments for those pupils.

The Present Study

The present study undertook to describe the components of teachers' curriculum planning as well as the knowledge referents used during curriculum planning. It is suggested by the literature on problem solving, and it is substantiated by the findings of Turner et al., McClure, and Pylypiw, that more important than particular curriculum planning procedures used by classroom teachers is the quality of their planning processes. Which types of procedures are followed in curriculum planning does not seem to affect the quality of the undertaking as much as does the efficiency, accuracy, and expertise with which information bearing on the planning task is handled. The skill of applying relevant theoretical principles to the contingencies of a particular problem situation in order to generate alternatives and devise a plan would seem to be an important addition to traditionally prescribed curriculum planning skills of sequential selection. Accordingly, in the present study, the curriculum planning processes of a group of experienced and prospective classroom teachers were examined to discover the amount, nature, and use made of theoretical and situational information relevant to a given curriculum planning task.

SUMMARY

The purpose of this chapter has been to draw an analogy between curriculum planning and problem solving in order to show that the crucial features of problem solving are also crucial features in curriculum planning, and as such, can serve as useful guidelines for a study of classroom teacher curriculum planning. Important elements common to both areas of study have been identified. These are information search factors, information utilization factors, and solution characteristics. The following chapter describes the design of a study of these three features of classroom curriculum planning.

CHAPTER THREE

DESIGN OF THE STUDY

The purpose of this study was to describe the curriculum planning processes of a group of prospective and experienced classroom teachers. The method used to accomplish this purpose was one in which subjects used a computer-assisted program to provide a retrospective self-analysis of their responses to a simulated curriculum planning task.

DESIGN RATIONALE

This study was an investigation into what Walker (1974) has termed the "practical wisdom" or knowledge-in-action of classroom teachers as curriculum planners. As such, it aimed to describe teachers' curriculum planning processes without experimental intervention by the researcher. Moreover, planning processes had to be examined in relation to a specific and known curriculum task because, as Schwab (1971) has said, "The practical is ineluctably concrete and particular [p.494]." In order to examine and compare the curriculum planning of a group of teachers, therefore, it was necessary for all subjects to address the same specific curriculum task. For this reason, subjects in this study were presented with a simulated task to stimulate curriculum planning. In this way, parameters of the planning situation could be defined by the researcher and the planning processes of various subjects under these circumstances could be examined and compared.

The simulated planning task devised for this study is described in Chapter Four. In brief, subjects were introduced via colored slides, printed materials, and verbal descriptions to a hypothetical group of grade two children in a typical suburban elementary school setting. Subjects were then given a broadly defined planning task to carry out in relation to these children under circumstances equivalent to those found in a typical suburban elementary school. The simulation offered the following advantages: (1) optimum balance between control and freedom of subjects' actions; (2) a realistic setting; and (3) a high level of subject motivation (McFarlane, 1971; McCluskey, 1973).

Describing subjects' responses to the simulated curriculum planning task entailed describing unobservable and sometimes elusive mental processes. A method widely used for this purpose is to request subjects to "think aloud" and to recount their thoughts as they occur. In the present study, this technique was adapted and used in an _ex post facto_ design setting similar to that used by Shulman (1974) in studies of the mental processes employed by medical doctors in diagnosing illnesses. In this way, subjects were allowed a maximum amount of time, independence, and freedom of movement during their planning period. After their four- to five-day planning period, subjects were asked to spend between one and two hours recalling, describing, and analyzing their curriculum planning, guided by a set of questions incorporated into a computer-assisted program which was developed for this study. The technique of guided retrospection was used in this study because of its potential as an efficient, unobtrusive, and valid means of securing accurate descriptions of subjects' planning processes.

There were a number of limitations inherent in the technique of retrospection which had to be overcome in the overall design of the study. The first of these was the potential for discrepancy between the logic-in-use during planning and the reconstructed logic described in an _ex post facto_ setting. The latter is often an idealization of the former (Kaplan, 1964). Subjects tend to recount what they believe they ought to have done rather than what they actually did (Campbell & Stanley, 1963). To minimize the effects of this discrepancy in the data gathered for this study, questions devised to guide retrospection were kept as broad and non-directive as possible in order to avoid suggestions of a preferred method of planning. (See Chapter Four for a description of the planning analysis instrument.) In addition, multiple data sources were utilized so that data from one source could be validated with equivalent data from another source. The multiple forms in which data were collected were (1) subjects' analyses of their planning processes provided via the computer program; (2) subjects' descriptions of their planning processes provided on the printed forms which accompanied the computer program; and (3) subjects' written curriculum plans.

A second limitation of retrospection as a means of data gathering is the possibility that subjects may simply forget some of the processes they used during their curriculum planning. In an attempt to prevent forgetting in the present study, subjects were informed of the need to remember their planning processes at the time of the initial presentation of the planning task, and the time period between planning stimulus and retrospective description was kept to a minimum.

There was a particular theoretical framework, as advised by Wiersma (1975) for this sort of research, which was used in developing questions to guide subjects' retrospective planning analyses. This framework was based on theory and research in problem solving, as described in Chapter Two. The primary elements of this framework which were operationalized for this study were characteristics of information search and information utilization, in particular, the modes of activity employed, the purposes for which information was sought, the sources of information consulted, and the theoretical or situational nature of the information sought or used. These elements were incorporated into a self-instructional computer-assisted program, called "L-PLAN," which consists of a series of questions about information search and utilization in relation to classroom curriculum planning. The program also includes some questions about subjects' background characteristics. These questions were constructed on the basis of studies of factors related to problem solving performance. An additional framework was needed to guide the investigator's analysis of subjects' written curriculum plans. This framework was drawn from the foundation areas of philosophy of education, sociology of education, educational psychology, and curriculum, as described in Chapter Two.

DESIGN DESCRIPTION

The following procedures were used in gathering and examining data on the curriculum planning processes of a group of prospective and experienced classroom teachers.

(1) Subjects were recruited from elementary education methods classes in curriculum, early childhood education, and language arts. Spring and summer session classes were used to assure the participation of experienced as well as prospective classroom teachers. Although participation in the study was voluntary, subjects were offered some form of non-graded course credit incentive to encourage serious participation and personal involvement in the study.

(2) Subjects were presented with the broadly defined curriculum planning task of planning a series of three lessons, one in detail and two in outline form, intended to increase the descriptive language abilities of a particular hypothetical group of grade two children. This hypothetical group of children, their classroom, their school, and their teachers were described to subjects by the researcher through presentation of colored slides, printed materials, and oral descriptions. The task presentation is described

more fully in Chapter Four, and illustrative materials are included in Appendix A.

(3) After having been given the task, subjects were allowed four to five days in which to plan the lessons requested. During this time, subjects were free to consult any available resources, print, non-print, or human, which were accessible to them. One day before explaining their plans, subjects were given printed materials describing briefly the format and terminology of the computer-assisted program which would be used to guide their plan explanations. These materials are described in Chapter Four and reproduced as part of Appendix B.

(5) Having completed their curriculum plans, subjects were asked to describe and explain in retrospect the curriculum planning processes which they had employed in developing their plans. This retrospective analysis was carried out using L-PLAN, a computer-assisted program designed for this study and run on the IBM 1500 instuctional system at The University of Alberta. Using this program, subjects described and analyzed their curriculum planning processes in terms of the modes of activity employed, the sources of information consulted, the purposes for which information was sought, and the kinds of information sought and used. Subjects also answered a series of questions

about their personal and professional backgrounds and about their emotional reactions to the experience of using the computer program. Description of the computer instrument is provided in Chapter Four and Appendix B.

(6) Finally, subjects' written curriculum plans and the printed forms accompanying the computer program were collected for analysis by the researcher. Performance recordings of individual subjects' responses to the computer program were also secured for analysis.

DATA ANALYSIS

The data gathered for this study consisted of (1) subjects' responses to the questions on curriculum planning, personal background, and emotional reactions, which were stored in coded form in the computer system; (2) subjects' written descriptions of each piece of information gathered during curriculum planning, which had been recorded by subjects on the printed forms accompanying the computer program; and (3) subjects' written curriculum plans.

The information recorded on the computer during subjects' use of L-PLAN was used to provide a description of each subject's strategy of curriculum planning. This strategy was defined by sequence and frequency counts of the modes of planning activity engaged in, the parts of the curriculum plan or purposes for which information was sought, the sources of information consulted, and the kinds of information, situational or theoretical, which were gathered. The data recorded on the computer, in combination with the data from the accompanying printed forms, were also used to tally the quantity of each kind of information sought by subjects during their curriculum planning, the number of times information was drawn from the subjects' own repertoire of background knowledge and personal experience, the number of times information gathered was not used in the curriculum plans, the number of times information not described was nevertheless evident in the plans, and the number of modifications the subjects made to their plans before, during, or immediately after using the computer program.

Data from the printed forms accompanying the computer program were used primarily as a verification device. These data enabled comparison of the actual piece of information as described by a subject with that subject's analysis of that information in the terms required by the computer program. Through such comparisons, inconsistencies, omissions, or misinterpretations of parts of the computer program were identified, according to a set of rules devised for that purpose. The rules used for interpreting the results of the computer instrument are described in Chapter Five.

The written curriculum plans produced by subjects in this study were examined for internal consistency with the situational information inherent in the planning task and setting, and for external consistency with theoretical information relevant to the planning situation. This examination was made using a plan analysis instrument developed for this study. This instrument is described in Chapter Four and reproduced in Appendix C. Measures of consistency were also compared with particular characteristics of subjects' planning strategies for possible relationships.

SUBJECTS

The subjects who participated in this study were 48 experienced and 12 prospective classroom teachers enrolled in one or more curriculum methods courses in the Faculty of Education at The University of Alberta during their participation. Altogether, 59 subjects provided the data base for the major part of this study. The data provided by one experienced teacher were not included in the study because of his accidental misuse of the Record Form accompanying the computer program.

All subjects had completed curriculum and instruction methods courses, and 78% had completed four or more. It can be assumed that almost all had completed courses in the foundation areas of sociology of education, educational psychology, and philosophy of education, since these courses are typically taken during the first two years of undergraduate work in The University of Alberta Faculty of Education. Of the 59 subjects, 62.7% had university degrees. The subjects in this study comprised a heterogeneous group of prospective and experienced teachers. They ranged in age from 18 to 56 years and over, with an average age of about 33.7 years. Although 12 lacked any full-time teaching experience, the average amount of classroom experience for all subjects was 6.9 years. Of those with classroom experience, 42.6% had had no recent experience in the primary grades (grades one, two, and three). Of all subjects, 54.2% had children of their own, and 25.4% had engaged in related tasks of lesson planning analysis.

The rationale for using such subjects in this study was that all of them, with the exception of one secondary school teacher, professed to be or were in the process of becoming, professional elementary school teachers for whom curriculum planning was an important skill. All had sufficient background preparation and experience to be expected to handle a curriculum planning task with some degree of competence. In addition, the presence of experienced teacher-subjects in a university credit course suggested a willingness on their part to look beyond the daily routine of the classroom. It was anticipated that these subjects, as well as the inexperienced student-subjects, would demonstrate an interest in and a commitment to the curriculum planning task set for this study and that they would work through it consciously rather than provide a ready-made, easily available answer.

Finally, the fact that these subjects were "on campus" during the period of their participation in this study facilitated the scheduling required for their participation and provided some commonality in the setting and resources available during planning.

Another group of five subjects who participated in this study were specialists in the field of language arts or curriculum. These five people participated in the study under slightly different circumstances and for a different purpose than did the other subjects. In order to conserve their time, these specialists were not given four to five days in which to prepare curriculum plans, but were asked to make their preparation immediately following presentation of the planning task by the researcher and just prior to going through the computer program. Specialists were included in the study in an attempt to secure an ideal model of curriculum planning against which other subjects' planning strategies could be compared.

CHAPTER FOUR

DEVELOPMENT OF INSTRUMENTS

The instruments used to gather, record, and analyze data on teachers' curriculum planning and plans were developed especially for this study. There were three such instruments: a simulation of a curriculum planning task to which subjects responded by engaging in curriculum planning and producing curriculum plans; a computer-assisted program by means of which subjects reflected on and analyzed the planning procedures they had used and the plans they had made; and a plan analysis instrument, including a guide for use, with which the curriculum plans themselves were analyzed.

THE SIMULATED PLANNING TASK

Requirements for the Task

The simulated planning task was intended to elicit from subjects a sample of curriculum planning similar to the planning subjects might do in an elementary school setting under favorable circumstances of time and resources. In order to accomplish this goal, the simulation had to present a curricular problem in an elementary school subject area in a non-prescriptive fashion. That is, the problem had to be phrased in broad terms such as are used in provincial programs of studies in order to permit teacher choice of particular objectives, curriculum content, teaching methods, instructional resources, and evaluation procedures. This is the situation which is becoming prevalent in more and more elementary school classrooms across Canada. In addition, the curriculum problem had to be such that it would be addressed in relation to an entire class of students of average intelligence and behavior patterns who were in a typical elementary school setting.

A search through the literature failed to reveal an available classroom simulation which met these requirements. Many of the available classroom simulations have been developed for instructional purposes and therefore tend to be highly prescriptive of teacher behavior. An example is Kersh's Classroom simulator. Simulations which are not prescriptive tend to focus on behavioral and discipline problems rather than on curriculum problems. A familiar example of these is Cruickshank and Broadbent's Teaching problems laboratory. Other simulations, for example, Project insite by Marten and others, focus on individual pupils instead of on an entire class of students. (Brief descriptions of these simulations can be found in Cruickshank, 1971.)

Development of the Task

For the purposes of this study, it was necessary to devise a simulation which presented a commonplace curriculum planning task in a familiar elementary school subject area for an average group of elementary school children in a typical suburban elementary school. In developing such a simulation, the following requirements were operative.

(1) The task itself had to be one for which a wide variety of subjects had some appropriate background. This requirement was set in order to permit the participation of a representative, and therefore non-specialized, group of classroom teachers.

(2) The nature of the task--its subject area, scope, and level of complexity--had to be similar to a curriculum task which an elementary school classroom teacher might reasonably expect to face. In this way, subjects would not be penalized due to lack of expertise in a particular subject area.

(3) The teaching situation described in the simulation had to be feasible and likely to be found in an elementary school. Descriptions of learners and school setting characteristics had to be firmly based in reality.

(4) The circumstances of planning, the facilities and resources available to planners, had to be equivalent to those which would normally be found in an elementary school setting.

(5) The scope of the planning task was critical in two respects. First, the task had to be specific enough to establish a common starting point and define the realm of planning, but broad enough to tolerate variety in the content, sequence, and format of subjects' planning. Second, the task had to be specific enough to encourage consideration of the details of the teaching situation, and broad enough to necessitate consideration of long-term requirements of curriculum planning, such as sequence and progression across lessons.

(6) Finally, the amount and kind of data presented with the task were critical. Data had to be informative enough to enable useful interpretation by subjects and neutral enough to avoid being prescriptive.

Description of the Task

The simulated planning task developed specifically for this study of classroom teacher curriculum planning was constructed according to the above criteria. The curriculum task was to plan one lesson in detail and two lessons in outline form which were intended to increase the descriptive language powers of a hypothetical group of grade two children. The task was assigned in the area of language arts on the assumption that in this, more than in any other elementary school subject area, both experienced and prospective teachers have had direct kinds of experiences and some basis for content knowledge. By reflecting on the language he uses daily, any adult can probably discern some of its rudimentary elements, forms, and functions.

In a school setting, language arts is an essential part of all elementary school curricula at every grade level. An examination of major textbooks for the language arts and of the Alberta _Elementary language arts handbook_ (1973) reveals the importance attached to the task of description in language. The realistic nature of this task was further verified through interviews with two classroom teachers, two language arts consultants, and two teacher educators.

The integrity of the simulated teaching situation in which this task was to be carried out was ensured by including a description of a class of grade two children in a suburban Edmonton elementary school. Cumulative record and personal history data on each child were distributed to subjects. Actual samples of the children's written language and notes of the lesson and assignment which stimulated the writing were also distributed. A series of 42 colored slides of the children engaged in various classroom activities was shown, and verbal descriptions of the organization, staff, facilities, and climate of the school were given. Samples of the materials distributed, a list of the slides shown, and the text of the verbal presentation are included in Appendix A.

While subjects were engaged in the task, instructional resources equivalent to those most frequently used by elementary school classroom teachers were available to them. Gardner (1971) found in his study of 15 elementary school teachers, that teachers consulted principals, subject area specialists, librarians, fellow teachers of the same grade, curriculum resource persons, reading consultants, psychologists, and media specialists, in descending order of frequency, during lesson planning. In the on-campus simulation of curriculum planning used in this study, the researcher acted in the role of the school principal, and university instructors were available to respond to questions which might normally be answered by field consultants and specialists. Librarians, media specialists, and fellow teachers were available on campus to serve the same functions as would their counterparts in the schools.

The scope of the simulated task, while limited to the topic of description in language, allowed for wide diversity in the particular dimensions of descriptive language each subject could develop and in the instructional methods each subject could utilize. The assignment of one lesson to be planned in detail was intended to encourage subjects to consider particular characteristics of the children, setting, and resources with which they were working. The request for two subsequent plans in outline form was intended to occasion long-term consideration of scope and balance, sequence and progression, development and reinforcement in planning.

The descriptive data initially provided to subjects scrupulously avoided interpretive statements but were intended to have a potential for informative interpretation by perceptive subjects. Similarly, the procedural data given to subjects described the task but omitted suggestions of appropriate emphases or procedures. The data which were presented to subjects are included in Appendix A.

Pilot Tests of the Task

Prior to presentation of the simulated task to the 60 subjects who participated in the main part of the study, the simulation was piloted with eight subjects on four different occasions. These pilot runs served mainly to bring the scope of the task and the explicitness of the directions for planning into proper perspective. As a result of these pilot tests, the scope of the task was pared down from three complete lessons to one lesson in detail and two others in outline form, and directions given for planning were made more explicit. In presentations made for the main study, subjects were urged to keep notes for their own future recall about their planning processes and to note on their written plans for the benefit of the researcher the anticipated role the teacher was intended to play during the execution of the lesson plans.

Use of the Task

The simulated planning task took 40 to 45 minutes to present, allowing a minimum of 15 seconds per slide and permitting some time for questions of clarification. During the presentations made for this study, subjects were encouraged to take notes and to observe carefully. When printed materials were distributed, subjects were given time to peruse them before being shown pictures of the children whose work was represented. While the slides were being shown, only points of information were made. For example, typical morning procedures followed in the class were explained, and short character sketches of three children were provided. On some occasions, subjects chatted among themselves about their initial interpretations of the pictures. Usually however, subjects watched attentively and made notes on the pictures.

The simulation was presented on five different occasions for the 60 subjects who participated in the main part of this study, and three times in abbreviated form for the five experts in the study. The abbreviated form of the simulation differed from the 40-minute presentation only in that the pictures of the children were displayed all at once on a slide sorter instead of consecutively at 15-second intervals. The experts took an average of about five minutes to examine the 42 pictures.

THE COMPUTER-ASSISTED PLANNING ANALYSIS PROGRAM

Requirements for the Computer Program

Having developed a procedure to elicit from subjects instances of curriculum planning, it remained to devise a means of describing and analyzing the planning that resulted. The method selected for this task was one of guided retrospection. After subjects had completed their curriculum planning, they were encouraged to reflect on their planning processes in order to describe the procedures they had used and the considerations they had made. The framework for this description was based on studies of problem solving, as described in Chapter Two, and it was comprised of measures of information search and information utilization. Additional descriptions of subjects' experiential and personal background were also desired, as well as an indication of subjects' emotional responses to the description and analysis task.

In contemplating a suitable means for gathering data, a number of needs were apparent. The instrument used had to be capable of being administered to a large number of individuals simultaneously, but it also had to be able to accommodate wide variations across individuals in types of planning procedures described. The instrument thus had to have a minimal branching capacity so that, for example, a negative answer given by a subject to a Yes/No question would suppress a latent request for elaboration by the researcher on that question. At the same time, allowance had to be made for possible elaboration on any question at the initiation of the subject. In addition, provision had to be made for elaboration or modification by the subject of the entire plan, so as not to omit any part of the planning that a subject might carry out as an appendage to his original plans. Finally, the instrument had to be minimally time-consuming and conveniently accessible, and it had to stimulate sufficient interest that subjects would take time to complete it carefully.

Development of the Computer Program

The most appropriate vehicle available for meeting these requirements was a computer-assisted instructional system. At The University of Alberta, the IBM 1500 computer system presently has twenty instructional stations, each consisting of a combined cathode-ray tube and typewriter-like keyboard, an image projector, and an audio unit. Material programmed into the computer is presented to the subject in printed or diagrammatic form on the cathode-ray tube, in schematic or pictorial form on the slide projector screen, or aurally through earphones. Subjects respond to these stimuli by speaking into the headset, by typing a message onto the cathode-ray tube, or by pointing with a light pen to a choice displayed on the cathode-ray tube. Programs can be written for this system which incorporate multiple branching logic so that a subject's response to one question determines the next question presented. Subject and material can thus interact without the presence of a human instructor.

Using the cathode-ray tube and keyboard parts of this system, it was possible to meet all the above requirements for an instrument which would guide subjects in describing their curriculum planning considerations. The availability of 20 instructional terminals made it possible to handle 20 subjects simultaneously yet individually. Differences in subjects' planning descriptions could be accommodated by providing a wide variety of choices for answers with appropriate branching commands after each choice. At any point at which a response was requested, it was possible for subjects to type in an elaboration of their answers. The automatic branching built into the program also eliminated for subjects the time-consuming task of reading many directions and flipping printed pages in order to find the next appropriate question. Time required to complete the program was thus minimal. Finally, a computer system was novel to most subjects and was expected to engender a high level of motivation.

In devising an instrument with these capacities for the specific purpose of guiding subjects in a description and analysis of planning processes, the following considerations had to be taken into account.

(1) Questions asked about planning procedures had to be phrased in a form easily answered by subjects. In order for the computer instrument to have the capacity to be self-administered, the questions asked had to be intelligible and straightforward so that no specific knowledge of curriculum planning as an area of study in itself was required.

(2) The questions asked had to focus on important as well as answerable aspects of curriculum planning. Length of the total program was a critical factor in this respect. The program had to be short enough so that subjects could sustain the high level of concentration required until the end of the program.

(3) The instrument had to guide the dissection of the complex processes involved in curriculum planning into discriminable bits which could be recorded sequentially.

The instrument would thus make planning processes intelligible to the subject as well as to the researcher.

(4) The format of the program had to be simple enough to be retained in memory and explicit enough that it could be followed by subjects who had had no previous exposure to the computer system used. The potential for contamination of data due to lack of subjects' familiarity with the equipment had to be minimized.

(5) In order to use a multiple-choice format successfully, choices displayed after each question had to predict a representative yet comprehensive range of planning behaviors. To guarantee comprehensiveness, a safeguard, in the form of a choice labelled "Something else," had to be included with each question.

(6) In order to take full advantage of the computer system, the program had to record and store data collected in a form amenable to later analysis.

Description of the Computer Program

The computer-assisted instrument developed to analyze curriculum planning in this study was constructed in accordance with these recommendations. It is called "L-

PLAN." While the entire computer program is not long, the amount of time a subject spends on it varies with the length of his initial curriculum planning, the elaborateness of his description, and his facility in using the computer program. In an effort to expedite subjects' performance, an overview of the computer program is provided in printed form the day before subjects sign on to the computer terminals. This handout is reproduced in Appendix B. As part of the computer program itself, the program format is explained to subjects in detail before the first question on information search is asked. The entire computer program is also preceded by a prepared explanation of the computer system available to all system users. The main body of the instrument consists of a series of multiple-choice questions in two main sections. The questions in Section One are intended to elicit from subjects a description of their recently completed planning procedures. The questions in Section Two focus on demographic data. Each section is discussed separately below.

Section One. In Section One, subjects are queried about the information they sought during their curriculum planning and how they used that information to produce their curriculum plans. The questions are simple, straightforward, and short. They are presented in the following sequence:

(1) Can you explain how you made your plans?
(2) What did you do first when you began planning?
(3) What part of your plan were you concerned with?
(4) What was the source of your information?
(5) What kind of information did you get or use?
(6) Was the information of any use in your planning?
(7) Is the information of use now?
(8) Please record your information.
(9) Have you made any changes in your plans?
(10) Please record these changes.

A subject responds once to each of these questions for each piece of data he considered during his planning. In order to describe more than one piece of information, the subject recycles through questions (2) through (10), which are displayed again with appropriate time sequence modifications. In this way, the planning processes are described step by step. For a flowchart of the logic governing the display of questions in the computer program, see Appendix B.

The mode of response is simple multiple-choice. Questions (2), (3), (4), and (5) are each followed by an array of alternatives from which a subject selects the one which most accurately describes his planning procedures. In order to ensure comprehensiveness in the choices offered, the choice of "Something else" is always included. When a subject chooses "Something else," he is asked to type in his own answer to the question. This answer is stored and recorded for later interpretation and possible categorization by the researcher.

While answering questions (6) through (10) on information utilization in Section One, the instructions to "record" refer to a color-coded printed form, called the "Record Form," which accompanies the computer program. This form is shown in Appendix B. In response to question (9), the subject is asked to list on the left-hand side of the form the particular piece of information he found and is in the process of describing, and, opposite it on the right-hand side, the part of his lesson plans, if any, to which it applies. If the information thus described constitutes a change in the subject's original plans, the subject is asked in question (10) to note the new ideas by placing an "N" opposite them in the right-hand margin of the Record Form. At the end of his last cycle through questions (2) through (10), the subject is asked to compile any changes he has made to his plans since beginning the computer program on another color-coded form, called the "Revised Record Form," which is shown in Appendix B. Using this form, the subject is asked to rewrite his altered plans, labelling original and revised parts of the plans in the left-hand margin.

The intent of questions (6) through (10) on information utilization and of questions (2) through (5) on information gathering have been validated by reference in Chapter Two to research on problem solving, in which the quantity, sequence, source, type, purpose, and use of information sought during planning have been identified as relevant variables. In addition, the choices displayed under each of the four questions, (2) to (5), have been validated in various ways, as explained below.

The list of possible search behaviors, called "modes of activity," which is presented after question (2) was generated in interviews with two summer school classes of 15 to 25 returning teachers. The list was intended to be as comprehensive as possible, even at the expense of a certain amount of overlap among choices. This overlap could be eliminated during analysis of data by collapsing certain categories, as shown in Table 1.

TABLE 1

EQUIVALENT CATEGORIES FOR ANALYZING CHOICES OF MODES OF ACTIVITY

COMPUTER PROGRAM CHOICES	CATEGORIES FOR ANALYSIS
Write something	Write
Draw something	Write
Reflect on something	Reflect
Read something	Read print materials
Consult something or someone	Read print materials Consult verbally
Talk with someone	Consult verbally
Ask questions of someone	Consult verbally
Listen for something	Observe pupils
Observe someone	Observe pupils
Go somewhere	Quest for additional information
Look for something	Quest for additional information

Question (3) deals with the elements included by subjects in their lesson plans. The component parts of a plan were called "curriculum categories." The categories used in the computer program for this question were derived from three sources: (1) a detailed content analysis of the lesson plans of 21 elementary school teachers carried out by Jeffares (1973); (2) a combined analysis by McClune (1970) of 19 curriculum works and the planning procedures described by 43 elementary school teachers; and (3) seven basic steps of curriculum planning extracted from the literature by Gardner (1971) in preparation for his study of classroom teachers' curriculum planning needs. Equivalences of categories identified in these three sources and the curriculum categories used for the computer program in the present study are shown in Table 2. Definitions of the latter are given in Appendix B.

TABLE 2

DERIVATION OF CURRICULUM CATEGORIES

JEFFARES	McCLUNE	GARDNER	L-PLAN
Student characteristics	Learners and learning	Student needs and interests	Your pupils
Teacher characteristics	Teacher competencies		Yourself
Curricular elements	Objectives	Objectives	Objectives
Instructional procedures	Learning opportunities	Methods	Strategies
Resources		Materials	Resources
Evaluation	Evaluation	Evaluation	Evaluation
	Form of lesson plans		Lesson plans
	Society		
	Human knowledge		
			Something else

The sources of information listed with question (4) in

Section One of the computer program are those identified by Gardner (1971) in his study of the curriculum planning needs of 15 elementary school classroom teachers. Table 3 shows in descending order of frequency the sources of help consulted most frequently by the teachers in Gardner's study, and the corresponding information sources used in the computer program in the present study. Some additional sources of information not identified by Gardner are included in the computer program list of choices in order to ensure comprehensiveness. Additional categories used in L-PLAN include "Yourself," "Your pupils," "Pupils' parents," "Curriculum guides or official documents," "Teachers' manuals," "Professional references," and, of course, "Someone or something else."

TABLE 3

DERIVATION OF CATEGORIES FOR SOURCES OF INFORMATION

GARDNER STUDY	L-PLAN
Principal or assistant	Researcher
Subject specialist	Language Arts specialist
Fellow grade teacher	Friend
Librarian	Librarian
Curriculum worker/ resource person	Curriculum professor Psychology professor
Media/audio-visual worker	Librarian
Reading teacher-consultant	Reading specialist

The kinds of information referred to in question (5) are the two broad categories of theoretical and situational information, with appropriate subdivisions under each based on the foundation areas of philosophy of education, sociology of education, educational psychology, and curriculum. The rationale for using these foundation areas as sources of information relevant to curriculum planning has been explained in Chapter Two. In displaying the choices available after question (5), use of the terms "philosophical," "sociological," "psychological," and "curricular" was deliberately avoided. Instead, an attempt was made to display descriptive choices which distinguished between practical and theoretical kinds of information and also related to each of the four foundation areas. The frame displaying these choices is reproduced below.

What kind of information did you get or use or think of? Please try to characterize your information according to one of the following categories.

Was it GENERAL information about:

--the goals schools should fulfill;
--what constitutes language competence;
--how social setting influences a child;
--how children usually grow and develop;
--how lessons should be planned.

Or was it PRACTICAL information about:

--the actual situation for which you were planning;
--something else.

Whatever you point at will be expanded.

It can be noted that the term, "general," refers to theoretical information and that the first two choices under this heading correspond to philosophical information, and the next three to sociological, psychological, and curricular information respectively. Expansions given for each of these choices are definitional. They are shown in Appendix B. Multiple choices are allowed within each subcategory. An expansion is also given for the choice of information about "the actual situation for which you were planning." It is as follows:

There are many kinds of practical information you might have gotten or used. Please press the space bar and choose the category which best describes your information. Whichever category you choose on the next screen will be expanded.

Was it information about:

--Language arts or about the official aims of education in the province;
--Your pupils' family background or peer relationships;
--Your pupils' personal characteristics;
--Your own personal characteristics;
--The setting--facilities, organization, and resources available;
--Some other practical information.

As with the choices given under "general" kinds of information, the alternatives displayed for "practical" or situational kinds of information can be categorized according to each of the four foundation areas. The first three choices correspond to philosophical, sociological, and psychological kinds of information respectively, and the next two to curricular information. Further expansions of these choices are definitional. They are also given in Appendix B. Again, multiple choices within each subcategory are allowed.

Section Two. Section Two of the computer program is comprised primarily of demographic questions designed to identify elements of subjects' personal background and experience which may be related to characteristics of their curriculum planning. These questions deal with subjects' age, sex, number of offspring, amount and recency of teacher preparation, university degrees, amount and level and nature of teaching experience, reaction to the computer system, familiarity with the task, and level of performance satisfaction. Multiple responses and individual elaborations are possible for each question.

This section of the computer program also includes questions on subjects' emotional reactions to the planning description and analysis task. Subjects are queried about their feelings of confidence while using the computer program, and on their feelings of satisfaction about their performance after they have completed the computer program. These questions are included in the computer instrument in order to gather indications of subjects' interest and anxiety levels. It was suspected that interest level would affect the care and attention paid by subjects to the computer program; and it has been shown (Pruitt, 1957; Sieber & Lanzetta, 1966) that anxiety level can influence the quantity of information sought during decision making. Some indication of the extent to which these emotional factors might affect the data gathered with this computer instrument was required.

The display sequence of the demographic and emotional response questions in Section Two of the computer program and their branching logic are shown in Appendix B.

Data gathered by the computer are stored in coded form such that an eight-digit code reflects one cycle of a subject through the information search and utilization questions of Section One. For each subject therefore, the number of codes recorded corresponds to the number of cycles made through Section One of the computer program, which in turn corresponds to the number of discrete pieces of information processed during initial planning, and described in the computer program. Subjects' responses are also retrievable in literal form, so that elaborations on the choice of "Something else" can be printed out in the same form in which subjects typed them into the computer. The form in which subjects' responses would be recorded was determined during the writing of the computer program. The format described was devised in order to facilitate tabulation of frequency and sequence counts by the researcher. This in effect makes the gathering and recording of data simultaneous and greatly eases the task of analysis.

Pilot Tests of the Computer Program

After initial development, the computer planning instrument was refined through a series of pilot runs and debugging sessions. In all, 63 subjects participated in 14 pilot runs of the program; debugging went on continually. The subjects who participated in this piloting included 13 experienced classroom teachers who were taking curriculum and instruction courses at The University of Alberta at the time of their participation; 10 senior level graduate students and faculty members in the areas of language arts, curriculum, and early childhood education in the Faculty of Education; and 40 undergraduates in language arts or early childhood education methods classes.

These subjects took part in the piloting under varying conditions and for various purposes. Some were not presented with a curriculum planning task to explain before using the computer program; some were not required to fill out the printed forms accompanying the program; and some were presented with the planning task and requested to fill out the printed forms along with using the computer program, but were not given introductory materials before encountering the computer program. During the period of piloting, the computer program went through two revisions. Fifty-one pilot subjects were exposed to the first version on 12 different occasions; and 12 used the second version in two different runs.

In general, subjects were asked to examine the computer program for clarity, flow, directness, and explicitness of both content and instructions. They were also asked how accurately the program permitted them to describe their planning procedures. In particular, language arts and curriculum specialists were asked to check the program for validity in their area of expertise. Classroom teachers were asked to comment on the intelligibility of the program, on the effect of the computer equipment on their performance, and on the relevance of the program to their classroom situations. In addition, all pilot subjects were asked to note technical malfunctions and grammatical errors. These pilot tests served to establish the face and content validity of the instrument.

As a result of the pilot tests, an introductory handout of materials was compiled to prepare subjects not only to describe what procedures they had used during curriculum planning, but also to explain the sources and bases of their planning procedures. The materials in the handout were designed to familiarize subjects with the structure and intent of the computer program without contaminating or influencing subjects' curriculum planning. In order to avoid influencing subjects' planning activities, the introductory materials were distributed to subjects after they had completed their curriculum planning on the day before they encountered the computer program. The handout is shown in Appendix B.

As a further result of the pilot runs, directions internal to the computer program were clarified, emphasized, and repeated more often. The list of available choices under some questions was also expanded. For example, the choice "Class notes" was added to the list of information sources. In questions which had multiple subparts, such as definitional expansions of kinds of information (see Appendix B), provision was made for selecting more than one answer. Mechanisms to allow multiple responses to some of the demographic questions, for example, univeristy degrees, were also introduced. Finally, all technical bugs and grammatical errors were eliminated.

Use of the Computer Program

The computer instrument, L-PLAN, was used to gather data on curriculum planning processes from 60 prospective and experienced classroom teachers and five curriculum specialists in eight different sessions. In preparation for going through the computer program, subjects were asked to bring with them to the terminal room all plans, notes, and other easily portable materials they had used or made during their curriculum planning. The purpose of this request was to facilitate subjects' recall of planning procedures and to allow the researcher to collect subjects' plans and other available materials at the conclusion of the computer session. Subjects spent an average of 60 minutes explaining their curriculum planning processes on the computer. Time spent by individual subjects ranged from about 40 to 90 minutes.

No introduction to the computer equipment or program was necessary: subjects were automatically signed on to the terminals by the operator, and the system itself was completely self-explanatory. While using the computer program, subjects were free to ask questions of the researcher, who proctored each session. Requests were primarily for technical help in recycling the program to eliminate a mistaken choice, or in recalling a lost frame due to an excessive period of delay in responding. There were three requests for confirmation of interpretations made by subjects of their planning procedures. All questions were answered as thoroughly as possible.

There was evidence of tension in some subjects as they worked through the computer program. It was apparent that L-PLAN required a high level of concentration from most subjects. However, reactions to the program were primarily positive, as has been reported in Chapter Five, in the section on emotional reactions to the computer program. Also in Chapter Five is a report of the validity and reliability of the computer instrument.

The program itself is catalogued in the Division of Educational Research Services in the Faculty of Education at The University of Alberta under the title, "L-PLAN."

THE PLAN ANALYSIS INSTRUMENT

The data obtained from the use of the computer planning analysis program consisted of subjects' own descriptions of their planning processes and of how these processes had contributed to the formulation of their curriculum plans. Although it was the primary purpose of this study to describe subjects' planning processes, it was decided to examine in addition the written results of these processes, the curriculum plans, for the following reasons.

Subjects' written curriculum plans were examined first of all in order to supplement data provided by the computer program, L-PLAN. Because of the intensity and complexity of the task of explaining planning processes, there was a possibility that subjects had described only part of their curriculum planning processes on the computer program. The curriculum plans could provide evidence of other aspects of curriculum planning that had been omitted from the computer decription. Secondly, written plans were examined in order to validate the descriptions given by subjects with the computer program. Written plans represented an alternate form of some of the same data gathered via the computer program, and could thus serve a validation function in the areas of data overlap. Lastly, subjects' written plans were examined in order to utilize an available indicator of the consistency and coherence with which subjects had combined their data to form curriculum plans.

Requirements for the Plan Analysis Instrument

In order to compare a subject's written curriculum plans with characteristics of his planning processes as described on L-PLAN, an instrument was needed which would indicate the presence in unstructured written curriculum plans of the same categories of theoretical and practical information used in L-PLAN, and thereby permit the inference that information identified in the plans had been considered by the subject during curriculum planning. In this way, considerations not described by subjects using the computer program could be identified; and descriptions provided by subjects on the computer could be validated.

In addition, a means was required for judging the appropriateness and coherence with which various kinds of considerations had been combined to form curriculum plans. This requirement implied the need for a set of criteria to guide judgments of appropriateness and coherence. The criteria had to be sufficiently broad to be applicable to the wide variety of curriculum plans produced, and sufficiently specific to reflect awareness of the particular requirements of the given planning situation.

Development of the Plan Analysis Instrument

The development of an instrument which would satisfy the above requirements for analyzing subjects' written curriculum plans was guided by the following considerations.

(1) An easy-to-use rating form had to be devised with provisions for checking the amounts of theoretical information, situational information, and internal coherence in plans, all of which had to be scored on a workable rating scale.

(2) Measures of plan consistency and coherence had to be defined and operationalized.

(3) The situational information inherent in the curricular task and setting which had been presented to subjects at the beginning of the study had to be specified explicitly so that it could be identified in subjects' plans. Some of this situational information had been stated explicitly in the materials prepared for presentation of the planning task. Other information, for example, information concerning pupils' level of knowledge in language, was implicit in the task presentation materials and had to be drawn out and stated clearly.

(4) The theoretical information which was potentially relevant to the planning task and setting had to be identified and operationalized so that it could be detected in subjects' plans. This required the formulation of lists of prescriptive principles drawn from descriptive statements in each of the four foundation areas of philosophy of education, sociology of education, educational psychology, and curriculum.

(5) Cues in subjects' plans which could be interpreted as indicators of awareness of theoretical and situational information had to be labelled. For example, in order to determine a subject's awareness of peer group relationships, some aspect of lesson organization in his lesson plans might be specified as the appropriate indicator.

(6) A procedure for scoring subjects' plans to reflect awareness of theoretical and situational information and level of coherence had to be established. A method was required for indicating the relative use of various kinds of information and relative degrees of coherence so that subjects' plans could be compared with their planning descriptions and with each other.

The instrument developed in accordance with these considerations was called an "Analysis of Written Curriculum

Plans" form. It was accompanied by a "Guide for Using the 'Analysis of Written Curriculum Plans' Form," which explained the intentions underlying each of the questions on the form, described procedures for using the form, and provided descriptions of the theoretical and situational information relevant to the planning task.

The concept of consistency served as the principle which guided the development of the plan analysis instrument. Plans could be judged for consistency with computer-mediated planning descriptions, with the situation for which the plans were intended, with relevant theoretical information bearing on the planning task and setting, and with themselves in terms of internal consistency and inter-lesson consistency. The purpose of a measure of consistency with the planning descriptions provided via the computer program was to validate and amplify the computer descriptions. The importance of consistency with theoretical and situational information relevant to the curriculum task was suggested by the work on problem solving cited in Chapter Two. The significance of the particular categories of theoretical and situational information (philosophical, sociological, psychological, and curricular) which were chosen for the consistency citeria was suggested by educational theorists and teacher education programs, also described in Chapter Two. In addition, use of these particular categories of information was necessary in order to maintain correspondence between descriptions of written plans and descriptions of planning processes provided via the computer program.

A precedent for the application of these categories of information as criteria for evaluating the situational consistency of curriculum plans was provided by Ammons (1964). In operationalizing recommendations for curriculum development found in the works of Tyler (1950) and Jensen (1950), Ammons produced the following criteria which are equivalent to the categories of criteria used in the present study: (1) "validity--do objectives accurately reflect the aims of the controlling agency?" (situational:philosophical information); (2) "comprehensiveness--do objectives reflect all the aims of the board?" (situational:philosophical information); (3) "appropriateness--do objectives seek to develop behaviors appropriate for the learners for whom the objectives are proposed?" (situational:psychological and sociological information); (4) "feasibility--are objectives practical in the given situation?" (situational:curricular information) (Ammons, 1964, p.453).

Ammons also applied measures of within-plan consistency equivalent to those employed in the present study. These criteria and their equivalences include (1) "precision--are objectives clearly enough stated to give the proper guidance in selecting learning situations and evaluation techniques?" (internal consistency); (2) "consistency--will the achievement of any one objective make the achievement of any of the others impossible or doubtful?" (inter-lesson consistency) (Ammons, 1964, p. 453). The particular aspects of internal consistency used in the present study were the presence and validity of the parts of a lesson plan as identified by Jeffares' content analysis (1973), namely, objectives, content, strategies, resources, and evaluation. Assessment of inter-lesson consistency was based on evidence of continuity, or repeated elements, and progression, or development of content, across lessons (R. Jackson, personal communication, 1974). These elements are similar to those proposed by Posner (1974) for judging curricular structure. Posner's criteria for evaluating curriculum plans included commonality, by which he meant repetition or continuation of subject matter across lessons; and temporality, by which he meant the time sequence relationship between lessons.

Description of the Plan Analysis Instrument

The instrument, "Analysis of Written Curriculum Plans," consists of a series of 12 major questions, each with a set of subquestions. All questions are phrased such that they can be answered "Yes" or "No." Some may be answered "Inc" if there is insufficient data in the plans on which to base an answer. There is some overlap among questions to increase the inter-item reliability. The instrument is reproduced in Appendix C. Explanation of the intent of each question and suggestions of how to identify answers to each question in the written curriculum plans are provided in an accompanying "Guide for Using the 'Analysis of Written Curriculum Plans' Form." The guide is shown in Appendix C.

Questions in the plan analysis form are divided into four main sections: "Internal Consistency," "Inter-lesson Consistency," "External Situational Consistency," and "External Theoretical Consistency." Each of these sections is described separately below, with supplements from the guide for using the plan analysis form.

Internal consistency. Judgments of internal consistency are based on the presence, explicitness, validity, and interrelationships of lesson objectives, curriculum content, teaching strategies, instructional resources, and evaluation procedures. These are the same elements used as curriculum categories in L-PLAN. Definitions of these elements are provided in the guide, along with synonyms which might serve as cues to the presence of the elements in written plans.

Inter-lesson consistency. Judgments of inter-lesson consistency are based on the degree of continuity and progression evident across lessons. The questions in this section of the form urge analysis of plans for relationships of reinforcement, continuation, and sequential development among elements of the plans.

External situational consistency. The questions in this section of the form guide examination of plans for philosophical, sociological, psychological, and curricular congruence with the planning situation. Subquestions amplify the meaning of each kind of congruence, and the guide provides the situational data against which congruence is to be judged.

External theoretical consistency. The questions in this section are also divided into philosophical, sociological, psychological, and curricular categories. Subquestions direct attention to particular aspects of plans which might serve as indicators of awareness of task-relevant philosophical, sociological, psychological, and curricular principles. Potentially pertinent principles in each category are listed in the guide.

The plan analysis form is scored by calculating the percentage of "Yes" answers out of all questions in each of the four main sections of the form. These percentages reflect degrees of internal, inter-lesson, and external situational and theoretical plan consistency. They can be used to indicate not only relative levels of each kind of consistency within a subject's plans, but also to indicate comparative levels of each kind of consistency across a number of different subjects' curriculum plans.

Pilot Tests of the Plan Analysis Instrument

The plan analysis instrument and guide were tested independently by two language arts members of the Faculty of Education and the researcher using 15 lesson plans randomly selected from a total of 59 plans. The instruments were examined for clarity, feasibility, and ease of use.

As a result of initial piloting of the plan analysis form, two additional consistency indicators were included, one for situational:philosophical consistency, and one for situational:sociological consistency. In the guide for using the plan analysis form, directions and definitions were made more explicit in some areas and were amplified in others. The lists of synonyms which could serve as cues for identifying parts of plans were also expanded.

After these modifications had been made and scores corrected for the 15 plans, pairs of scores provided by the three judges were compared to establish an average level of reliability for the plan analysis instrument. The measure of reliability was calculated as a percentage of agreement out of total responses made. The average level of inter-judge reliability achieved was 79.5%. This measure is explained more fully in the following section.

Validity and Reliability of the Plan Analysis Instrument

The validity of the plan analysis instrument developed for this study depended on the veracity with which the instrument reflected the theoretical construct of consistency in written curriculum plans. This question is addressed through an examination of the definition of consistency used and its operationalization in the plan analysis instrument.

Bruner, Goodnow, and Austin (1956) defined two contexts within which to judge consistency: a procedural context and a nomological or theoretical context. In the first, the task is to establish a classification system that other investigators can distinguish if they follow the directions for finding it. In the theoretical context, the task is to demonstrate that the identifications which result from the use of the classification scheme are consistent with a theoretical conceptualization of the area.

Turner and Fattu (1960a) adapted this definition of consistency in order to apply it to curriculum problem solving tasks. For this purpose, they equated procedural consistency with situational goodness of fit. By this they meant appropriateness of the problem solution to relevant data in the problem situation. Nomological consistency was taken to mean consistency with the rationale or theory underlying the problem.

Turner and Fattu's adaptation of Bruner, Goodnow, and Austin's definition of consistency was operationalized in the plan analysis instrument developed for this study. In this instrument, the two levels of consistency to be measured were labelled "Situational" and "Theoretical." To establish the plan analysis instrument as a measure of the situational consistency in lesson plans, the data inherent in the planning task situation were identified. This identification was accomplished through careful observation and analysis of the planning task. The resulting body of factual information was classified into subcategories corresponding to philosophical, sociological, psychological, and curricular kinds of information, and directions were provided in the accompanying guide for applying this classification system in analyzing written curriculum plans.

A similar procedure was used to establish the plan analysis instrument as a measure of the theoretical consistency in lesson plans: a body of pertinent theory was defined and classified, and directions for its application were provided. The identification of pertinent theory was made on the bases of theory and research in curriculum planning, as described above and in Chapter Two. One subcategory of theoretical information, namely curriculum, was expanded to yield measures of the internal coherence and inter-lesson continuity in lesson plans, so that overall, there were four categories of consistency sought in curriculum plans. These four were internal consistency, inter-lesson consistency, external situational consistency, and external theoretical consistency.

Having validated the bases on which the plan analysis instrument was developed, it remained to demonstrate that its classification systems could be used reliably by other people. Accordingly, a randomly selected sample of 15 lesson plans was scored by two judges using the instrument. Both judges succeeded in identifying in the plans the categories used in the plan analysis instrument 95.9% of the time or more. That is, of 555 required identifications per judge (37 per plan), there were only 23 instances in which one judge failed to make a categorization, and 21 instances for the second judge. However, the fact that 91.3% of these instances were common to both judges suggests that the required information was simply lacking from the plans in most of these instances. There were only two instances in which one judge failed to make an identification where the other one succeeded.

Reliability of the plan analysis instrument was established not only in the identification of categories of consistency, but also in the judgmental use of these categories. The average levels of agreement in evaluating 15 randomly selected sets of plans on each type of consistency were the following: internal consistency 78.9%; inter-lesson consistency 84.3%; external situational consistency 78.7%; and external theoretical consistency 76.1%. These percentages include the scores produced by two judges and the researcher independently. The overall average level of agreement among all three scorers was 79.5%.

Use of the Plan Analysis Instrument

The instrument for analyzing written curriculum plans was used by the researcher to judge the internal and external consistency of the 64 sets of lesson plans provided by the 59 subjects and five experts who participated in the main part of this study. When determining the answer to each question on the form, all written material provided by the subjects was taken into account. In addition to the plans themselves, some subjects had provided an introductory rationale, a list of preparatory steps, a running account of ruminations during planning, or explanatory notes in the margins of plans. An attempt was made to answer each question with "Yes" or "No" and to avoid the use of "Inc" as much as possible. The latter response was made only when the absence of more than one lesson per subject made judgment of inter-lesson consistency impossible. The amount of time required to judge the consistency of one subject's curriculum plans varied according to the length, organization, and legibility of the plans. The average amount of time required for analyzing the plans of subjects in this study was 15 minutes per subject.

CHAPTER FIVE

RESULTS OF THE ANALYSIS OF THE DATA

The data used in this study were of three kinds: analyses of curriculum planning processes provided by subjects using a computer-assisted program; literal, self-descriptions of the information subjects considered during their planning; and subjects' written curriculum plans which were the products of their planning processes. Fifty-nine subjects engaged in curricular planning in response to a planning task simulation presented by the investigator. After completing their planning and writing their lesson plans, subjects described and analyzed their planning in retrospect using a computer program designed for that purpose and called "L-PLAN."

The first section of this chapter is an explanation of the procedures used in interpreting the descriptions and analyses of planning processes provided by subjects via the computer program. It is a report on the validity and reliability of the computer instrument. The second section of this chapter is a report of the descriptions of planning processes given by subjects using this computer instrument. In the second section, the research questions on information search and information utilization have also been addressed.

The written curriculum plans which subjects produced were analyzed by means of a plan analysis instrument developed for this study. In the third section of this chapter, the results of these plan analyses have been presented. These data refer to the research questions on internal and external consistency of subjects' written curriculum plans.

In the final sections of this chapter, comparisons have been made between subjects' planning processes and their background characteristics. Particular attention has been given to subjects' emotional reactions to the computer program, including their feelings of performance satisfaction. A brief report of the performances of the curriculum experts who participated in the study is also included.

VALIDITY AND RELIABILITY OF THE COMPUTER INSTRUMENT

Subjects' ability to use the computer instrument to describe and analyze curriculum planning provided one measure of its validity. The intent of the instrument was to elicit from subjects descriptions and analyses of their curriculum planning in terms of (1) the kinds of practical or theoretical information which were referred to, (2) the sources of information which were consulted, (3) the particular parts of the plans, called curriculum categories, for which information was sought, and (4) the modes of activity which were used during this process. Subjects succeeded without assistance in providing such descriptive analyses 81.8% of the time. Further interpretation of an additional 16.7% of subjects' responses by the researcher produced complete descriptions of planning procedures 98.5% of the time. That is, of 1048 responses made to the computer program by 59 subjects, 857 were made unassisted by subjects, 175 required further interpretation by the investigator, and 16, or 1.5%, were ambiguous and uninterpretable.

The interpretations of subjects' responses made by the researcher involved either recategorizing subjects' open-ended responses or redefining the categories subjects had used in their descriptions. These changes were made on the basis of written descriptive information provided by subjects themselves on the Record Forms accompanying the computer program. On these forms, subjects recorded the particular pieces of information they had considered during their curriculum planning and the parts of their plans for which this information had been intended. Record Forms were filled out while using the computer program, so that a subject's written descriptions paralleled his responses made via the computer. Thus, by comparing data in these two forms, it was possible to validate the categories used in the computer program by each subject when describing his planning processes. The process by which this was done is described in the next subsection.

The reliability of the computer instrument was reflected in the amount of consistency evident within and across various subjects' performances. Although there were always at least eight and sometimes as many as 15 choices available under each of the four major questions asked, subjects chose the same two or three descriptors for each question at least half the time. In response to the question about the mode of activity used, subjects selected "Reflected" and "Wrote" 62.6% of the time. The intent of these activities 59.4% of the time was to seek information about the pupils themselves, about teaching strategies, or about lesson objectives. The sources consulted 56.6% of the time were the planners themselves or the pupils for whom the plans were being made. Subjects were concerned with practical information about their pupils or the teaching setting, or with theoretical information about child growth and development, 49.3% of the time.

Combinations of only these most frequently made choices occurred 21.0% of the time. Of the 59 subjects, 57.6% used a combination of these most frequent choices at least once, and 37.3% used more than one such combination during their planning processes.

Considering subjects individually, only four subjects (6.8%) never made the same choice twice in any category in the series of four questions answered. Of all 59 subjects, 83.0% used the same mode of activity at least twice, 78.0% used the same curriculum category at least twice, 89.8% used the same source of information at least twice, and 81.4% used the same kind of information at least twice.

This is not to say that subjects' overall use of the computer instrument was restricted to a small number of usable alternatives. On the contrary, subjects averaged more than three out of five different choices when answering the four major questions. While divergence among subjects' responses indicated differences in planning strategies, the amount of convergence among and within subjects' performances demonstrated some common aspects of widely practiced strategies which subjects were able to describe repeatedly using the computer program. The latter was a measure of the reliability of the instrument.

The interpretations made by the researcher of 16.7% of subjects' responses to the computer program are explained in the following subsection.

Further Interpretations of Subjects' Responses

There were two types of subject responses which required further interpretation by the researcher. One was the open-ended response and the other was the mislabelled choice. Subjects made open-ended responses to one of the four major questions whenever they did not perceive any of the displayed choices as appropriate. The open-ended response was made by pointing to the choice "Something else" on the cathode-ray tube and then typing in the desired answer. This occurred a total of 83 out of a possible 1048 times, or 7.9% of the time.

In 81 out of 1048 cases (7.7%), subjects selected an available category which did not accurately reflect the piece of information they were describing. These mislabelled choices were detected by comparing subjects' written descriptions on the Record Forms accompanying the computer program with choice selection on the program itself. When a discrepancy was evident, it was resolved in favor of the more explicit written description.

Criteria for interpretation. In most cases, the written descriptions provided by subjects clearly indicated the nature of the consideration being made and provided a firm basis for recategorization by the researcher of subjects' open-ended or mislabelled choices. For example, one subject characterized the following piece of information as belonging to the category, "Pupil characteristics."

> From [my] own experience, a means of specifying objectives in light of the above [known abilities of seven- and eight-year-old children] and the means of setting up learning experiences to attain them.

Although considerations described here did include attention to pupils' characteristics, they were quite evidently based on the subject's own knowledge and were primarily curricular in nature. This response was recategorized by the researcher to include both "Practical:Pupil characteristics" and "Theoretical:Curriculum" labels.

In other cases however, the most appropriate label for an open-ended or mislabelled response was not immediately evident. These more obscure cases occurred in relation to the third and fourth major questions about sources of information consulted and the nature of information being considered. In dealing with these two categories of open-ended and mislabelled choices, it was necessary to develop some explicit sets of criteria.

(1) Sources of information. Ambiguity in the sources of information identified by subjects stemmed primarily from the amount of overlap among the various information sources available in the computer program. The 15 choices displayed, including the open-ended response option, included explicit labels for any source a subject might reasonably be expected to consult when planning while on a university campus. Such comprehensiveness was intended to facilitate subjects' choice selection: an explicit label is easier to identify than an equivalent one. Equivalence among categories provided the basis for reclassification of information sources in 34 out of 35 instances by the researcher. There were two different conditions under which such recategorizations were made.

The first of these occurred when subjects referred to data that were provided during the task simulation which was presented by the researcher and dealt with information about a hypothetical group of grade two children. Source labels used by subjects to refer to this data included "Class notes," "Researcher," and "Curriculum professor." These were all recategorized to reflect "Pupils" as the appropriate origin of the information. Altogether there were 23 instances of recategorization on this basis involving the responses of 19 subjects.

The second criterion for reclassification of information sources was whether or not the source consulted was an elementary school teacher. Nine subjects used the open-ended response or the choice "Class notes" to refer to "the previous teacher" or some other elementary school teacher on 12 occasions. This type of response was considered by the researcher in the same sense as the choice "Friend." All of these referred to subjects' peers in the teaching profession and were thus equivalent to Gardner's category (1971), "fellow teacher of the same grade." Information source choices which referred to an elementary school teacher were thus recategorized as "Friend."

(2) Kinds of information. The need for

recategorization of subjects' responses about the kinds of information considered arose primarily when subjects described consideration of activities and/or materials to be used in their lessons. When subjects provided a rationale for use of activities or materials, that rationale served as the criterion for recategorization of open-ended or mislabelled choices. A list of the categories used for each type of rationale follows in Table 4. In all, these criteria were used to recategorize 38 out of 262 pieces of information (14.5%) provided by 23 subjects in response to the question about the kind of information used in planning.

TABLE 4

CRITERIA FOR RECATEGORIZING KINDS OF INFORMATION

RATIONALE	CATEGORY
needed for the sake of evaluation, objectives, or follow-up lessons	Theoretical:curricular
appropriate for seven-and eight-year-olds	Theoretical:psychological
contributes to language development	Theoretical:philosophical
uses appropriate available resources and facilities	Practical:curricular
consistent with the learning characteristics of the pupils concerned	Practical:psychological
contributes to the task of description in language	Practical:philosophical

Because there were no open-ended or mislabelled choices involving consideration of sociological factors, theoretical and practical variations of this category were not used.

Open-ended responses. The most frequent occurrence of the open-ended answer was in response to the question about the nature of the information sought during curriculum planning. In describing the kinds of information that figured in their planning, 32 of the 59 subjects used open-ended responses a total of 59 times. This represented 22.5% of all kinds of information described. In 22 instances, these responses were interpreted by the researcher as a particular type of practical information. Twelve of these were evident from subjects' Record Form descriptions, and 10 were recategorized according to the criteria for characterizing kinds of information given above. Another 22 open-ended responses were recategorized as a type of theoretical information. The criteria for recategorization were used for six cases and the rest were evident. In 15 cases, subjects' open-ended responses were too ambiguous to be recategorized.

In describing the sources of data used during curriculum planning, nine subjects used the open-ended response option on 12 occasions. This represented 4.6% of all information sources cited. On the basis of the elaborations provided by subjects, all but one of these open-ended responses were recategorized using the criteria described above.

When describing the particular aspect or curriculum category of their plans for which they were seeking information, subjects chose open-ended responses seven out of 262 times, or 2.7% of the time. However, for this question only, subjects who chose open-ended responses were asked to reconsider the piece of information they were describing and to attempt to characterize it using one of the eight categories provided. In order to aid subjects in this endeavor, provision was made in the computer program to give a definition of each of the curriculum categories displayed at subjects' request. Only three of the seven subjects who initially opted for an open-ended response requested definitions of the curriculum categories. All three of these subjects eventually selected one of the categories for which they had requested definition. Subjects' open-ended responses and eventual choices are listed below in Table 5. Definitions which were available for each curriculum category are included in Appendix B.

TABLE 5

OPEN-ENDED RESPONSES: REQUESTS FOR DEFINITION OF CURRICULUM CATEGORIES

N	SUBJECTS' EXPLANATION OF OPEN-ENDED RESPONSES	DEFINITIONS REQUESTED	SUBJECTS' FINAL CHOICE
1	suggestions of objects to use for sensory awareness	resources	resources
1	if kids could brainstorm for descriptive words	--	pupils
1	activity to start with	--	strategies
1	lesson seen taught during student teaching	strategies myself	myself
1	what new skills children would need	--	content
1	previous teacher's lesson	--	strategies
1	whether or not to use [activities from a language workshop]	strategies objectives resources content myself	myself

Open-ended responses were rare when subjects were in the process of describing the modes of activity they engaged in during their planning. They occurred six out of a possible 262 times, or 2.3% of the time. On one occasion, a subject used the open-ended response to explain that he had finished his plans. This in effect completed his planning description. Of the other five cases, three subjects responded with synonyms for one of the available choices displayed, and two subjects described the execution instead of the preparation of their plans. All five subjects, after explaining their open-ended responses, were cycled back to the beginning of the next sequence of four major questions about curriculum planning. That is, they were immediately asked, "What did you do next in your planning?" As they continued through the sequence of four major questions, subjects in effect recategorized their own open-ended responses to the question about the mode of activity they employed.

Mislabelled Choices

There was a total of 81 mislabelled choices, representing 7.7% of the 1048 choices made. As with the open-ended response, the most frequent occurrence of the mislabelled choice was in response to the question about the kinds of information considered during planning. Of 262 instances of labelling kinds of information, mislabellings occurred 49 times, or 18.7% of the time. Inaccurate identification of kinds of information accounted for 49 of the 81 (60.5%) mislabellings. Most instances of mislabelled kinds of information involved descriptions of activities and/or materials subjects planned to use in their lessons. These accounted for 38 of the 49 (77.6%) mislabelled choices made in response to the question about kinds of information considered. They were recategorized according to the criteria already described with the frequency shown in Table 6.

TABLE 6

FREQUENCY OF RECATEGORIZATION: KINDS OF INFORMATION

CRITERION	FREQUENCIES
principles of language development (Theoretical:philosophical)	1
principles of learning (Theoretical:psychological)	1
principles of curriculum (Theoretical:curricular)	16
task of description (Practical:philosophical)	12
pupils' characteristics (Practical:psychological)	3
facilities and resources available (Practical:curricular)	5
TOTAL	38

Other recategorizations of mislabelled kinds of information were evident from subjects' Record Form descriptions. In all, 26 pieces of practical information (17.8%) were recategorized and 23 pieces of theoretical information (19.8%) were recategorized.

A similar number of information source identifications made by subjects were also recategorized. A total of 24 out of 262 or 9.2% of the information sources cited were mislabelled by subjects. These were recategorized under the two conditions described above.

Recategorizations of curriculum categories were made a total of eight times out of 262 instances, or 3.1% of the time. These were evident on the basis of subjects' written descriptions provided in their Record Forms. Modes of activity, as described, were never recategorized.

Additional Reponse Identifications

Sometimes in examining subjects' descriptions of their planning processes, it was necessary to add categories to the choices made for each of the four major questions in order to describe all the considerations that had been made. Such situations arose when a subject described two or more steps in his planning process with only one cycle of the computer program. The tendency to collapse the description of multiple steps was evident only in the descriptions of subjects who used a small number of cycles to explain their planning processes: no additional response identifications were necessary in descriptions which extended beyond five cycles.

Overall, additional responses were provided by the researcher a total of 46 times out of 1048 instances, or 4.4% of the time. They resulted in the addition of 53 new response identifications to the 1048 originally identified by subjects on the computer program. These 53 new response identifications were distributed across the four main categories as shown in Table 7.

TABLE 7

NEW RESPONSE IDENTIFICATIONS

CATEGORY	NUMBER	PERCENTAGE OF NEW RESPONSES PER CATEGORY
Kinds of Information		
Practical	19	11.5
Theoretical	29	20.0
Sources of Information	3	1.1
Curriculum Categories	2	.8
Modes of Activity	0	0

With the addition of these 53 new categories, the total number of responses made to all questions by all subjects was 1101. This total has been used throughout the rest of the study as the base figure for the calculation of frequencies and percentages used to characterize subjects' planning processes. Of this adjusted total number of responses, 4.8% or 53 were added to subjects' original responses by the researcher.

Idiosyncrasies

There were only four instances among the 59 subjects when it was necessary to adjust the computer program manually. In three cases, subjects accidentally pointed to an unintended choice in describing their planning processes. When this happened, they immediately informed the researcher, who was acting as proctor. A note was made on the Record Form to discount the cycle in question and the subject was recycled to the beginning of a new series of four questions. In the fourth case, after finishing the entire program, a subject asked to add one more cycle to his planning description. He was manually returned to question (2) in the program, "What did you do next in your planning?" and he added a description of additional deliberations.

These four instances provided the only occasions in which the sequence of data on the Record Forms took precedence over the sequence displayed on the computer performance recordings. In two additional cases where discrepancies appeared between a subject's Record Form and his performance recording, the data on the latter were taken as the more accurate. In one case, this resulted in the omission from the data of a cycle found on the Record Form but not on the performance recording. In the other case, a cycle included in the performance recording but not on the

Record Form was included in the data used for the study.

One further idiosyncrasy was the partial loss of the meaning intended in one subject's typed-in open-ended response. This loss was due to the limited capacity of this particular computer program to store typed-in data. In this case, this limitation prevented the full description of an activity by the subject, but did not affect any tallies of modes of activities employed by subjects, because the subject himself recategorized his activity immediately after describing it.

Summary

The nature of all reinterpretations made by the researcher of the 16.7% of subjects' original responses which required further interpretation is shown in Table 8.

TABLE 8

SUMMARY OF REINTERPRETATIONS

CATEGORY	RECATEGORIZED OPEN-ENDED RESPONSES	MISLABELLED[1] CHOICES	NEW RESPONSES IDENTIFIED	TOTAL[2]
Kinds of Information				
Practical	37	26	19	88
Theoretical	7	23	29	39
Sources of Information	11	24	3	40
Curriculum Categories	0	8	2	8
Modes of Activity	0	0	0	0
TOTAL	55	81	53	175

[1] Excludes recategorized open-ended responses.

[2] These totals are not sums of rows because columns are not independent. For example, recategorization of an open-ended response may also have resulted in the identification of an additional response.

Reinterpretations were of three types: (1) recategorization of open-ended responses, (2) recategorization of mislabelled responses, and (3) identification of additional responses implicit in subjects' written descriptions of their planning processes but not identified by subjects in the computer program. Most reinterpretations (72.6%) were made in one category, the kind of information considered during planning. Of the rest, 22.8% of the reinterpretations were of the sources of information consulted, and 4.6% were of the curriculum category considered. No reinterpretations were made of the modes of activity subjects engaged in during their curriculum planning. Incorporation of these reinterpreted pieces of data into the original data provided by subjects yielded the following adjusted subtotals per category: 310 kinds of information (165 practical and 145 theoretical), 265 sources of information, 264 curriculum categories, and 262 modes of activity. The original figure for each of these categories was 262, and the original total of all pieces of information described by subjects was four times 262, or 1048. With the addition of 53 pieces of information which resulted from researcher interpretations of subjects' responses, the adjusted total (which is also the sum of the adjusted subtotals above) was 1101 pieces of information. This adjusted total has been used as the base figure in the analysis and discussion of data reported in Chapters Five and Six.

On the basis of this adjusted total, researcher interpretations carried the following weights per category: kinds of information 11.5% (practical 8.0%, theoretical 3.5%), sources of information 3.6%, curriculum categories .7%, and modes of activity 0. All reinterpretations made represented 15.9% of the adjusted total of 1101 responses used as the data base in this study.

CHARACTERISTICS OF SUBJECTS' PLANNING PROCESSES

In using L-PLAN to describe the planning they had carried out in response to the task presented by the researcher, the 59 subjects who participated in this study used a total of 1101 choices spread over 262 cycles. Each cycle consisted of four major questions: (1) What did you do when you were planning? (2) What part of your plan were you concerned with? (3) What source of information did you consult? and (4) What kind of information did you consider? The average number of cycles for each subject was 4.4 cycles. The distribution of cycles per subject is shown in Table 9.

TABLE 9

NUMBER OF CYCLES USED BY SUBJECTS TO EXPLAIN THEIR PLANNING

NUMBER OF CYCLES USED	NUMBER OF SUBJECTS
1	3
2	6
3	10
4	14
5	11
6	7
7	2
8	4
9	1
10	1

The questions about planning processes which this instrument was designed to address focused on characteristics of information search and information utilization. Information search was described in terms of (1) how much useful information subjects drew from their repertoire of personal experience, (2) how much information subjects gathered from external sources, and (3) what strategies subjects used in gathering and referring to these various pieces of information. Characteristics of subjects' information utilization were described in terms of (1) how much information was gathered and not used, (2) how much information was evident in plans and not described via the computer program, and (3) how many modifications were made to the plans. Each of these subquestions has been treated separately below.

Information Search

Information search was described not only in terms of the first three subquestions listed above, but also according to whether the kind of information sought was practical or theoretical.

Information known. A measure of the amount of information drawn from personal experience and used during curriculum planning was obtained by noting the number of times a subject referred to himself as the source of information when he was describing his curriculum planning. For the 59 subjects who participated in this study, "Myself" was the source of information cited in 95 out of the 265 information sources identified, or 35.8% of the time. One hundred two pieces of information were drawn from this personal store of knowledge. Practical and theoretical types of information were almost equally represented. Subjects cited themselves as the source of 50 pieces of practical information about the task of description in language and about appropriate materials and activities for the particular students which whom they were concerned. These 50 pieces of information which subjects drew from their experience represented 30.3% of all practical information described. The subject's own knowledge was the source of equally as many pieces of theoretical information. Subjects referred to themselves as the source of 52 pieces of theoretical information about the nature of language competence, the characteristics of child growth and development, and principles of curriculum planning. This represented 35.9% of all theoretical information consulted. Some 17 subjects did not refer to themselves at all as the source of information considered during curriculum planning. This means that 42 out of 59 subjects (71.2%) accounted for the use of oneself as a source of information as described above. Nevertheless, all subjects but one who described themselves as sources of information also consulted other outside sources. The one subject who consulted only himself described his planning process in one step and thus relied on his own background knowledge only once.

Information gathered. Similarly, from external sources subjects also gathered roughly equal amounts of practical and theoretical information. Of 208 pieces of information gathered from outside sources, 115 or 55.3% were practical, and 93 or 44.7% were theoretical. This information comprised 67.1% of all information used during planning and was gathered by 58 of the 59 subjects, or 98.3% of all subjects. All subjects but one consulted one or more outside sources for information during their curriculum planning. The frequency with which various outside sources were consulted is discussed in the following subsection and is shown in Table 13 on page 184.

Strategies used. The strategies used by subjects in gathering and referring to information during curriculum planning were described according to the frequency and sequence of the kinds of information, information sources, curriculum categories, and modes of activity identified.

(1) Kinds of information. The kind of information considered by most subjects most frequently, as shown in Table 10, was practical information about the particular pupils for whom curriculum planning was being carried out. Of second greatest concern were general principles of child growth and development. Close behind these in frequency of consideration were two other categories: the curricular setting for which planning was intended, and the nature of language competence. These four kinds of information, two of a practical nature, and two of a theoretical nature, were the focus of subjects' attention 63.5% of the time. In these four most frequently considered categories, 5.5% more attention was given to practical information than to theoretical information: the former was considered 107 out of 310 times (34.5%), and the latter 90 out of 310 times (29.0%).

TABLE 10

FREQUENCY OF REFERENCE TO VARIOUS KINDS OF INFORMATION

N	KINDS OF INFORMATION	FREQUENCY	%
38	Practical:psychological (pupils' personal characteristics)	63	20.3
33	Theoretical:psychological (principles of child growth and development)	46	14.8
33	Practical:curricular (facilities and resources available)	44	14.2
31	Theoretical:philosophical (principles of language development)	44	14.2
26	Theoretical:curricular (principles of curriculum planning)	39	12.6
21	Practical:philosophical (task of description)	25	8.1
15	Theoretical:sociological (principles of social interaction)	15	4.8
14	Open-ended, uncategorized practical information	14	4.5
10	Practical:curricular (myself)	13	4.2
7	Practical:sociological (pupils' social characteristics)	6	1.9
1	Open-ended, uncategorized theoretical information	1	.3
TOTAL		310	100.0

Overall there was slightly more attention given to practical than to theoretical information. Of 310 pieces of information considered, 53.2% were practical, while 46.8% were theoretical. However, there were 26 subjects who considered theoretical information more often than practical information, and 24 subjects who paid more attention to practical than to theoretical information. Nine subjects gave equal consideration to both kinds of information.

For subjects individually, the pattern alternated between consideration of theoretical and practical information. There were 50 subjects (84.7%) who considered both practical and theoretical kinds of information. Regardless of the quantity of each kind of information they considered, most of these subjects (31 of 50 or 62.0%) did alternate between these two kinds of information throughout their planning processes. There were seven subjects who considered practical types of information exclusively and two who considered theoretical kinds of information exclusively, totalling 15.3% of all subjects.

Although subjects alternated between practical and theoretical considerations, across all subjects the proportion of practical to theoretical types of information considered was greater in earlier cycles of planning and steadily decreased as planning processes continued. While in the first four cycles this proportion was in favor of practical information, for the last six cycles the ratio shifted in favor of theoretical information. This shift is shown in Table 11.

TABLE 11

FREQUENCY OF REFERENCE TO PRACTICAL AND THEORETICAL KINDS OF INFORMATION BY CYCLE

KIND OF INFORMATION	CYCLE 1	2	3	4	5	6	7	8	9	10
Practical	47	38	29	24	14	7	4	2	-	-
Theoretical	35	31	23	23	15	9	4	3	2	1
TOTAL CYCLES	59	56	50	40	26	16	8	5	2	1

The sequence in which subjects considered particular kinds of information was related to the overall frequencies reported in Table 10. In each of the first four cycles, consideration of pupils' characteristics, overall the most frequently considered kind of information, ranked first or second in frequency of appearance. In the second cycle, consideration of the curricular setting was equally as frequent, and in the third cycle, pupils' characteristics were outranked in frequency of consideration by concern for the nature of language competence in general. Concern with principles of child growth and development ranked second or third in all of the first four cycles except the third, in which it ranked fourth after attention to the nature of language competence, to pupils' characteristics, and to the curricular setting. Thus, the two most frequently selected kinds of information--data about pupils' personal characteristics, and information on child growth and development--were considered most often and in the earliest stages of the subjects' curriculum planning.

Unique patterns of planning were exhibited by those 26 subjects whose descriptions of curriculum planning extended beyond the average 4.4 cycles. In the fifth and all succeeding cycles, principles of curriculum development were considered more frequently than any other kind of information. The most frequently used kinds of information in the first four cycles, concerning pupil characteristics, principles of child growth and development, the curricular setting, and language competence, were never primary considerations at these later stages. Table 12 shows the frequencies and ranks per cycle of various kinds of information considered.

TABLE 12

FREQUENCY AND RANK OF INFORMATION SOUGHT BY CYCLE

KIND OF INFORMATION	CYCLE 1	2	3	4	5	6	7	8	9	10
Practical: philosophical	8[1] 4[2]	4 3	4 5	4 4	3 4	1 4	1 3	-	-	-
Practical: sociological	1 8	4 3	1 7	-	-	-	-	-	-	-
Practical: psychological	21 1	12 1	10 2	12 1	3 4	4 2	-	1 2	-	-
Practical: curricular	10 3	12 1	8 3	4 4	5 2	2 3	2 2	1 2	-	-
Practical: self	4 6	3 4	2 6	1 6	2 5	-	1 3	-	-	-
Practical: uncategorized open-ended	2	3	4	3	1	1	-	-	-	-
Theoretical: philosophical	10 3	10 2	11 1	6 3	3 4	3 2	-	-	1 1	-
Theoretical: sociological	7 5	1 5	4 5	2 5	1 6	-	-	-	-	-
Theoretical: psychological	15 2	10 2	7 4	6 3	4 3	2 3	1 3	1 2	-	-
Theoretical: curricular	2 7	10 2	1 8	9 2	6 1	4 1	3 1	2 1	1 1	1 1

[1] Frequency of occurrence in each cycle.
[2] Rank based on frequency within that cycle.

TABLE 12 (CONTINUED)

KIND OF INFORMATION	CYCLE 1	2	3	4	5	6	7	8	9	10
Theoretical: self	-	-	-	-	-	-	-	-	-	-
Theoretical: uncategorized open-ended	-	-	-	-	1 6	-	-	-	-	-
TOTAL INFORMATION-SOUGHT	80	69	52	47	29	17	8	5	2	1
TOTAL CYCLES	59	56	50	40	26	15	8	5	2	1

[1] Frequency of occurrence in each cycle.
[2] Rank based on frequency within that cycle.

(2) Sources of information sought. As described above, the source of information consulted most frequently during curriculum planning was the subject's own professional knowledge and experience. The second most frequently consulted information source was the pupils for whom the plans were being made. Together, these two sources were consulted a total of 150 out of 265 times, or 56.6% of the time. The kinds of information gleaned from these two sources related primarily to general principles of child growth and development, information about particular pupils' personal characteristics, and about the particular curricular setting for which the plans were being made.

The next most frequently consulted sources of information were mainly print materials. Print sources ranked as the third, sixth, seventh, and eighth most frequently consulted sources of information and yielded 24.2% of all information gathered by subjects. The frequency of occurrence of all sources of information consulted is shown in Table 13.

TABLE 13

FREQUENCY OF REFERENCE TO INFORMATION SOURCES

N	SOURCES OF INFORMATION	FREQUENCY	%
42	Myself	95	35.8
32	Pupils	55	20.8
19	Curriculum guide	26	9.8
22	Fellow teacher	23	8.7
16	Specialist	19	7.1
13	Library	16	6.0
9	Teachers manual	11	4.2
9	Professional reference	11	4.2
4	Class notes	6	2.3
2	Parents	2	.8
1	Open-ended responses	1	.3
TOTAL		265	100.0

Few distinctive patterns of consultation were evident across subjects. The most frequently used source of information appeared most often in earlier parts of subjects' planning and less often in later parts due to the decrease in the number of descriptions which extended beyond four cycles. In all cycles, the subject's own knowledge ranked first as the most frequently consulted source and pupils ranked second, with a single exception. In the first cycle, the rankings were reversed. These rankings are shown in Table 14.

Although subjects themselves were the single source of information most frequently referred to in all but the first cycle, a large amount of information was also obtained from outside sources early in the planning. Only in cycles six, seven, and eight did subjects themselves provide the majority of all information sought in the cycle. The two subjects whose planning extended beyond eight cycles referred exclusively to external information sources in their last two cycles. This shift in emphasis from multiple information sources to reliance on self is shown in Table 15. The shift from external to internal sources of information was characteristic of the planning descriptions of 33.9% of all subjects. An additional 10.2% of the subjects described a shift in the opposite direction, from internal to external sources of information, and the remaining 55.9% of the subjects alternated in their use of internal and external information sources.

TABLE 14

FREQUENCY AND RANK OF INFORMATION SOURCES BY CYCLE

SOURCE OF INFORMATION	CYCLE 1	2	3	4	5	6	7	8	9	10
Curriculum guide	7[1] 3[2]	9 3	4 4	2 5	1 5	1 3	-	-	1 1	1 1
Specialist	5 4	3 6	3 5	3 4	3 3	1 3	-	-	1 1	-
Teachers' manual	2 7	1 7	3 5	2 5	2 4	1 3	-	-	-	-
Myself	15 2	16 1	18 1	16 1	12 1	8 1	7 1	3 1	-	-
Fellow teacher	5 4	7 4	6 3	4 3	-	1 3	-	-	-	-
Pupils	20 1	13 2	8 2	7 2	4 2	1 3	1 2	1 2	-	-
Parents	-	-	-	1 6	1 5	-	-	-	-	-
Library	-	5 5	4 4	2 5	2 4	2 2	-	1 2	-	-
Professional reference	3 5	3 6	4 4	1 6	[illegible]	-	-	-	-	-
Uncategorized	1 7	-	-	-	-	-	-	-	-	-
Class notes	2 6	1 7	-	2 5	1 5	-	-	-	-	-
TOTAL SOURCES CONSULTED	60	58	50	40	26	15	8	5	2	1
TOTAL CYCLES	59	56	50	40	26	15	8	5	2	1

[1] Frequency of occurrence in each cycle.
[2] Rank based on frequency within that cycle.

TABLE 15

USE OF EXTERNAL AND INTERNAL INFORMATION SOURCES BY CYCLE

SOURCE OF INFORMATION	CYCLE									
	1	2	3	4	5	6	7	8	9	10
External	45	42	32	24	14	7	1	2	2	1
Self	15	16	18	16	12	8	7	3	-	-
TOTAL CYCLES	59	56	50	40	26	15	8	5	2	1

(3) Curriculum categories. The curriculum category referred to most often was "Pupils." In 22.7% of their curriculum planning, subjects described a desire to gather information about their pupils. The three top-ranking curriculum categories, "Pupils," "Strategies," and "Objectives," accounted for the majority of subjects' concerns (59.4%) during the planning they described. The amount of attention given to other categories, such as content, resources, and evaluation, is shown in Table 16.

Although pupils were the focus of most attention overall, they were considered most frequently at the outset of the curriculum planning process. After that, they ranked second or third in frequency following concern for teaching strategies.

TABLE 16

FREQUENCY OF REFERENCE TO CURRICULUM CATEGORIES

N	CURRICULUM CATEGORY	FREQUENCY	%
42	Pupils	60	22.7
39	Strategies	55	20.8
33	Objectives	42	15.9
26	Content	31	11.7
18	Lesson planning	25	9.5
17	Resources	23	8.7
16	Evaluation	18	6.8
9	Myself	10	3.8
TOTAL		264	100.0

Most subjects showed the same high level of concern with methodology throughout the duration of their curriculum planning. The levels of concern with curriculum content and resources, while not high, were also constant throughout most subjects' planning processes. Lesson objectives rated most attention early in the planning and less attention at later stages of the process. Only late in the planning process was any attention paid to evaluation. Evaluation was the only curriculum category which appeared to be a common end point of consideration. Of the 16 subjects (27%) who gave any consideration to evaluation at all, 15 of them considered it only in the last or penultimate cycle of their planning descriptions. The point of occurrence of various curriculum categories is shown in Table 17.

TABLE 17

FREQUENCY AND RANK OF CURRICULUM CATEGORIES BY CYCLE

CURRICULUM CATEGORY	CYCLE 1	2	3	4	5	6	7	8	9	10
Resources	2[1]	7	3	3	4	4	-	-	-	-
	6[2]	4	5	6	2	2				
Objectives	10	11	9	6	2	2	1	1	-	-
	2	2	2	3	4	3	3	2		
Content	8	[illegible]	8	5	4	-	-	1	-	-
	3	5	3	4	3			2		
Strategies	5	13	15	11	3	5	1	1	1	-
	4	1	1	1	3	1	3	2	1	
Pupils	26	10	9	8	4	2	-	-	1	-
	1	3	2	2	2	3			1	
Myself	5	4	-	1	-	-	-	-	-	-
	4	6		8						
Evaluation	-	-	1	2	6	2	4	1	-	1
			6	7	1	3	1	1		1
Lesson planning	4	7	5	4	3	-	2	-	-	-
	5	4	4	5	3		2			
TOTAL CURRICULUM CATEGORIES	60	57	50	40	26	15	8	5	2	1
TOTAL CYCLES	59	56	50	40	26	15	8	5	2	1

[1] Frequency of occurrence in each cycle.
[2] Rank based on frequency within that cycle.

(4) Modes of activity. Subjects' predominant mode of

activity during curriculum planning was reflection. This accounted for 39.3% of all activities engaged in. Frequencies of all activity modes are shown in Table 18.

TABLE 18

FREQUENCY OF OCCURRENCE OF MODES OF ACTIVITY

N	MODES OF ACTIVITY	FREQUENCY	%
52	Reflect	103	39.3
36	Write	61	23.3
21	Read print material	38	14.5
19	Consult verbally	36	13.7
10	Quest for other information	16	6.1
8	Observe pupils	5	3.1
TOTAL		262	100.0

Although reflection was overall the most frequently reported activity, it was used more than any other mode of activity only in the earliest and latest stages of subjects' planning. In the first cycle of all subjects' planning descriptions, it accounted for 76.3% of all activities. By the third cycle, reflection was superseded in frequency of occurrence by writing, the second most frequently used category overall. Reading and oral consultation were also prevalent at this stage of the planning process. These frequencies by cycle are shown in Table 19.

TABLE 19

FREQUENCY AND RANK OF MODES OF ACTIVITY BY CYCLE

MODE OF ACTIVITY	CYCLE 1	2	3	4	5	6	7	8	9	10
Write	1[1]	3	19	16	12	3	3	2	1	1
	5[2]	5	1	1	1	3	2	1	1	1
Reflect	45	22	9	10	5	5	5	2	-	-
	1	1	2	2	2	1	1	1		
Quest for information	2	9	2	2	1	-	-	-	-	-
	4	3	3	5	4					
Observe Pupils	1	3	2	1	-	-	-	-	1	-
	5	5	3	6					1	
Consult verbally	3	6	9	8	5	4	-	1	-	-
	3	4	2	3	2	2		2		
Read print material	7	13	9	3	3	3	-	-	-	-
	2	2	2	4	3	3				
TOTAL MODES USED	59	56	50	40	26	15	8	5	2	1
TOTAL CYCLES	59	56	50	40	26	15	8	5	2	1

[1] Frequency of occurrence in each cycle.
[2] Rank based on frequency within that cycle.

__Summary.__ On the basis of overall frequencies, the most commonly occurring strategy would seem to involve reflecting about pupils on the basis of one's own store of knowledge in order to take into consideration personal characteristics of the particular pupils concerned. In fact, however, this strategy was used only four times, once by each of four different subjects. The combination of a mode of activity, a curriculum category, an information source, and a type of information which was used more frequently was found to be reflection on pupils with reference to what was known about the pupils in order to relate their salient personal characteristics to the plan. This strategy was used a total of eight out of 262 times (3.1%) by eight different subjects.

Subjects' planning procedures can also be described by considering the range of strategies which result from every possible combination of the two or three most frequently made responses to each major question in the computer program. In answering the question about the mode of activity used, subjects responded 62.2% of the time with either "Reflect" or "Write." The curriculum categories considered 59.4% of the time were "Pupils," "Strategies," or "Objectives." Subjects referred to their own store of information or to the pupils 56.6% of the time, and they used information about the pupils' characteristics, about principles of learning, or about the curricular setting 49.3% of the time. In all, 33 subjects (56.0%) provided 55 instances of strategies involving reflecting or writing (modes of activity) about pupils, teaching strategies, or objectives (curriculum categories) relying on oneself or the pupils (information sources) to consider pupil characteristics, principles of child growth and development, or the curricular setting (kinds of information). This represented 21.0% of all planning described by the 59 subjects.

Information Utilization

Overall, there was little difference in the number of references to kinds of information subjects sought during planning and the amount and kind of information which subjects found useful and incorporated into their curriculum plans.

Information gathered and not used. An indication of the rate of use of the information gathered was given by subjects when, after completing each cycle of the computer program, they responded to the question, "Was this information of any use to you in your planning?" Of a total of 310 bits of information gathered by subjects during their curriculum planning, only 12 bits (3.9%) were not used in the final plans of eight subjects (13.6% of all subjects). Of these, three bits were theoretical and nine were practical kinds of information.

In seven of the 12 instances (53.3%) in which information gathered was not used, subjects had consulted what was eventually perceived as a non-productive source of information. These non-productive sources included parents' views about the proper function of schools, cumulative record data on pupils, a curriculum professor, a professional reference, and in three instances, the pupils themselves.

In one case, a subject accumulated information which was initially perceived as useful, but which was later discarded in favor of an alternate activity considered more appropriate to the teacher's own expertise. One subject described three pieces of information which were not perceived as useful in the planning process. These were descriptions of the intended execution of the plan rather than of the development of the plan. Since the plan was not carried out, no useful information was gained from this description of intention. The last instance of non-use of a planning consideration occurred in the case of a subject who used the last cycle of his planning description to describe writing out the lesson plans he had formulated. This activity did not, of course, contribute to the content of his plans.

Information used and not described. An indication of information used by subjects in their curriculum planning but not described via the computer program was obtained by comparing subjects' written plans with their performance on L-PLAN. Using the plan analysis instrument and accompanying guide, which were developed for this study, subjects' plans were examined for compatibility with various kinds of theoretical and practical information. Measures of plan consistency with each kind of information were then compared with the occurrence of that kind of information in the subject's descriptions of his planning process.

Overall, subjects' plans were found to be consistent with 40.8% more information than subjects identified in their descriptions of their planning processes. The 214 instances in which this was the case were roughly equally divided between practical kinds of information (53.3%) and theoretical kinds of information (46.7%). The particular category of information most often apparent in subjects' plans and not described explicitly by subjects was practical information about the goals of education for the province. Overall, there was little variation in the amount of each kind of information used by subjects in their plans and not described in the computer program. Table 20 sets out the relative amounts and kind of information used and not described by subjects.

TABLE 20

INFORMATION EVIDENT IN PLANS BUT NOT DESCRIBED IN L-PLAN

KIND OF INFORMATION	INFORMATION DESCRIBED	INFORMATION USED BUT NOT DESCRIBED	TOTAL
Practical			
task of description	25	36	61
pupils' social characteristics	6(5)[1]	31	37
pupils' learning characteristics	63(1)	22	85
curricular setting	44(1)	25	69
myself	13	-	13
open-ended responses	14	-	14
SUBTOTAL	165	144	279
Theoretical			
language competence, educational goals	44	28	72
principles of sociology	15	26	41
principles of psychology	46(3)	22	68
principles of curriculum	39(9)	25	63
open-ended responses	1	-	1
SUBTOTAL	145	100	245
GRAND TOTAL	310	214	524

[1] Numbers in parentheses represent pieces of information described by a subject using L-PLAN but not apparent in his plans.

The combined total pieces of information described by subjects using L-PLAN and those evident in subjects' written curriculum plans was 524. Subjects referred explicitly to 59.2% of these pieces of information and implicitly to 40.8% of them.

Planning in accord with information that was not described using the computer program was characteristic of all but two subjects. On the average, subjects' plans were consistent with 3.8 kinds of information that were not described in the computer program. There were also 19 instances out of 310 (6.1%) in which information described by subjects during the computer program was not evident in the written plans. These are noted in parentheses on Table 20. Twelve subjects were responsible for these 19 occurrences.

Modifications. There was opportunity for subjects to modify their plans at two different points during the description of their planning processes. The first of these occurred whenever a subject described gathering a piece of information that was not of use to him in his planning. When this happened, the subject was asked immediately whether this piece of information were currently of use to him and whether he wanted to revise his plans at that point. Although there were 12 instances in which subjects described gathering non-productive information, there were no modifications made to plans during the course of planning descriptions.

There was one instance however, in which a modification of plans that had taken place during the planning process was described. This modification did not involve discarding any previously gathered information, but simply entailed modifying an earlier decision on the basis of new considerations. The subject concerned first reflected on the evaluation process and decided to "look at children's actual writing." He then reflected on evaluation in terms of the particular pupils with whom he was dealing and decided that in light of pupils' tendency to "get side-tracked by the use of conventions, spelling, etc.," he would change the evaluation measures to focus on "listing of descriptive phrases rather than the actual writing of paragraphs."

The second opportunity subjects had to revise their plans in the context of the computer program was presented to all subjects. After they had finished describing their planning processes and before they went on to answer personal background questions, subjects were asked whether, having just reflected on their plans and planning processes, they wished to make any changes in their final plans. Two out of the 59 subjects (3.4%) responded affirmatively to this question. One modified his original plan by defining objectives which had formerly been implicit in his plan. The other altered the procedure he would have used in carrying out the same planning task a second time. These revised procedures reflected a shift in initial emphasis from resources and curriculum guides to pupils and lesson objectives.

CHARACTERISTICS OF SUBJECTS' CURRICULUM PLANS

Using the "Analysis of Written Curriculum Plans" Form developed for this study, subjects' written lesson plans were examined for four different types of consistency: (1) internal consistency, (2) inter-lesson consistency, (3) external situational consistency, and (4) external theoretical consistency. The findings have been reported in the subsections which follow.

Internal Consistency

A measure of a plan's internal consistency was obtained by examining it on two criteria: (1) presence and explicit labelling of objectives, resources, content, strategies, and evaluation procedures, and (2) consistency among planned activities, intended objectives, and planned evaluation measures within the lesson. The levels of internal consistency of subjects' plans ranged from 7.7% to 100%, with most plans (43 of 59 or 72.9%) exhibiting at least a 50% level of internal consistency. The average level of internal consistency in all subjects' plans was 60.3%.

The part of subjects' plans most often omitted was evaluation: 72.9% of the plans either did not include any provisions for pupil evaluation or did not make these provisions explicit. Objectives were not present in 23.7% of the plans and were implied but not stated explicitly in an additional 16.9% of the plans.

Inter-lesson Consistency

The measure of inter-lesson consistency was based on the continuity and progression evident in subjects' plans from one lesson to the next in terms of objectives, activities, and evaluation measures. There were eight subjects who provided only one lesson plan (13.6%) and who therefore had no inter-lesson consistency score. Scores of the remaining 51 subjects ranged from zero to 100%. Thirty-five of these subjects (68.6%) attained at least a 50% level of inter-lesson consistency in their curriculum plans. The average level of inter-lesson consistency in all plans was

50%. Both lack of progression and lack of continuity were equally responsible for low scores. Fourteen plans rated 100% on the inter-lesson consistency measures.

External Situational Consistency

External consistency was measured at two levels, the situational or practical, and the theoretical. At each of these levels, plans were examined for consistency with relevant facts and principles in the areas of philosophy, sociology, psychology, and curriculum. The criteria derived from each of these foundation areas have been presented in the "Guide for Using 'Analysis of Written Curriculum Plans' Form" in Appendix C.

The criteria used in estimating the consistency of a plan with practical kinds of information were inherent in the planning situation as described in the task simulation presented to the subjects at the beginning of the study. Philosophical, sociological, psychological, and curricular characteristics of the planning situation were identified and used as the standard against which subjects' plans were examined for external consistency on the practical or situational level.

The levels of external situational consistency evident in subjects' plans ranged from 12.5% to 100%. Overall, subjects' plans were found to be appropriate to the planning situation for which they were intended. Of the 59 plans, 79.7% had a 50% or higher level of external consistency on this measure. Only one plan fell below the 24% mark. The average level of external situational consistency in all plans was 57.9%.

The criteria on which subjects' plans scored lowest were those which indicated the appropriateness of the plans to pupils' previous knowledge and experience in language. In particular, 66.1% of the plans were inconsistent on one or more aspects of this measure.

External Theoretical Consistency

The criteria used to establish the second aspect of a plan's external consistency were derived from commonly-held principles in the foundation areas of philosophy, sociology, psychology, and curriculum. When measured against these principles, subjects' plans showed a high level of consistency: 79.7% of all plans scored 50% or higher on external theoretical consistency. The lowest score was zero; ten plans reached the 100% mark. The average score was 60.9%. The criterion on which most plans (52.5%) rated lowest was consistency with principles of peer interaction.

Summary

The consistency scores of subjects' curriculum plans on all four measures are shown in Table 21. Although there were no subjects whose plans were wholly consistent on all four measures, subjects themselves were consistent in the quality of plans they produced. Most subjects whose plans rated low on one measure of consistency also rated low on the others. Conversely, subjects whose plans exhibited a high level of consistency on one measure also reached a high level on at least two of the others.

TABLE 21

LEVELS OF CONSISTENCY OF SUBJECTS' CURRICULUM PLANS

CONSISTENCY LEVEL	INTERNAL CONSISTENCY	INTER-LESSON CONSISTENCY	EXTERNAL PRACTICAL	EXTERNAL THEORETICAL
	NUMBER OF PLANS			
0-24%	4	4	1	5
25-49%	12	10	11	7
50-74%	21	12	19	17
75-99%	20	11	28	20
100%	2	14	-	10

A CASE STUDY

In combining the findings on all subjects' use of L-PLAN, focus on the individual sometimes blurred. In order to preserve the importance of the individual in curriculum planning, his unique thought processes and patterns of consideration, the following description of one individual's performance in this study has been provided.

This particular subject was selected for a case study because many of her background characteristics were typical or modal in the group of subjects who participated in this study and because her planning process description demonstrated thorough treatment and perceptive use of the computer instrument.

The subject was a female between 26 and 35 years old, with five to ten years of teaching experience at the primary level. She had no children of her own. She had a Bachelor of Arts degree and had taken more than four curriculum and instruction courses, some within the present academic year. Her interest level was high as she went through the computer program, and she was moderately pleased with her performance after she had completed her planning description. It was the judgment of the researcher based on her description that she had not actually engaged in an analysis of curriculum planning before participating in this study.

Description of Planning Processes

In describing her planning processes, this subject used a total of eight cycles, almost twice the number of cycles used on the average by all subjects. Of eight modes of activity engaged in, this subject chose to reflect 75% of the time, an activity favored by all subjects. This subject considered all curriculum categories except "Myself" and "Lesson planning" in the following order: "Pupils," "Objectives," "Lesson content," "Strategies," "Instructional resources," and "Evaluation." She used a variety of information sources, referring to her own knowledge and experience 37.5% of the time. Her other sources of information included "Class notes" on curriculum planning and a "Language arts specialist." The reliance on her own knowledge and on the pupils as the primary sources of information was typical of all subjects. The relative amounts of attention paid by this subject to practical and theoretical kinds of information was also typical: the subject herself identified four pieces of practical information and four pieces of theoretical information which she had considered. After scoring, her adjusted total kinds of information considered was four pieces of practical information and five pieces of theoretical information. The practical information she considered included pupils' characteristics (twice), the curricular setting, and the provincial language curriculum. At a more general level, this subject was concerned with principles of language competence, curriculum planning (twice), child growth and development, and pupils' peer interaction.

Further interpretation of this subject's responses by the researcher was required in two instances. The first was an identification of an additional choice not labelled by the subject. The second was a recategorization of a mislabelled response. In the first instance, the subject described on her Record Form consideration of the structured curriculum setting she would be coming into and expressed a desire to alter this situation by the use of activity centers, individualized instruction, and peer grouping. The subject labelled these considerations "Practical:curriculum setting." The researcher added the label, "Theoretical:sociological," to this description because of the stated desire to alter the previous setting by encouraging more peer involvement among pupils. The piece of information that was recategorized by the researcher was "...evaluation of children's writing according to the aspects that make for good writing." The subject labelled this "Theoretical:philosophical" information, referring to a concern with the components of language competence. However, because the focus was not on criteria for good writing, but on what aspect of writing to evaluate, this consideration was relabelled by the researcher as "Theoretical:curricular" information, referring to principles of evaluation.

In summary, this subject's planning description consisted in the following eight steps.

(1) reflecting on pupils using pupils as the source of information and considering both the curricular setting and principles of social interaction;
(2) reflecting on objectives in reference to pupils and considering pupils' characteristics;
(3) reflecting on objectives based on the subject's own knowledge about the nature of language competence;
(4) reading about lesson content in class notes on curriculum planning;
(5) consulting with a language arts specialist about teaching strategies consistent with the provincial language curriculum;
(6) reflecting on instructional resources based on the subject's own experience and considering principles of learning, growth, and development;
(7) reflecting on evaluation based on the subject's

own knowledge and considering principles of evaluation in curriculum;

(8) reflecting on evaluation in reference to pupils and considering pupils' language learning characteristics.

All the information this subject gained during her curriculum planning was useful to her in her final plans. In the last two steps of her planning description, the subject described the refinement of a decision about evaluation. Having considered evaluation in theoretical terms and having decided to evaluate samples of children's written prose, the subject then considered the pupils' limited writing abilities and decided instead to base evaluation on pupils' listing of descriptive phrases. The subject made no modifications to her plans while describing her planning processes nor after having completed the computer program.

Description of Curriculum Plans

The plans which this subject produced showed a high level of consistency according to the "Analysis of Written Curriculum Plans" form used to analyze subjects' written curriculum plans. On measures of internal consistency, her plans rated 92.3%. They included all essential parts of a lesson plan--resources, objectives, strategies, evaluation, and content--with all but the last explicitly labelled. These parts were also consistently and logically related to each other throughout the plans. The continuity and progression from one lesson to the next were also logical and consistent: the plan rated 100% on inter-lesson consistency. Measures of external consistency were made at two levels. On the situational level, this subject's plans rated 75%. Although while using the computer program the subject had described consideration of pupil peer interaction and grouping of pupils, these aspects were not evident in any portion of her lessons. This omission was responsible for the score of 75%. On the second type of external consistency, this subject's plans rated 100%. The plans were judged consistent with the bodies of theory from educational philosophy, sociology, psychology, and curriculum which relate to curriculum planning and teaching/learning.

PLANNING PROCESS CHARACTERISTICS BY GROUPS

In this section, profiles have been drawn of groups of subjects who performed in particular ways during their curriculum planning. Background characteristics have been given for subjects in four groups: (1) those subjects who used predominantly theoretical information during planning, (2) subjects who referred primarily to the practical aspects of the planning situation, (3) subjects who relied mainly on their own knowledge and experience during their lesson planning, and (4) subjects who used more than the average five cycles to explain their curriculum planning. In the first group, there were 26 subjects (44%), and in the second group, there were 22 subjects (40.7%). Nine subjects (15.3%) used equal amounts of theoretical and practical kinds of information and have been omitted from these tallies. There were 22 subjects (40.7%) who relied on their own personal knowledge 50% of the time or more throughout their planning processes. Fifteen subjects (25.8%) used more than five cycles to explain their curriculum planning. The background characteristics found in the majority of subjects in each of these groups have been identified in the subsections which follow.

Subjects Who Referred Primarily to Theory

Twenty-six subjects (44%) used more theoretical than practical kinds of information during their curriculum planning. Most of these were people who had had more than two years of teaching experience (61.5%), although to rely more on theory than on practical information was not particularly characteristic of people with any given amount of teaching experience over two years. Most subjects who participated in the study also had more than two years of teaching experience. It was characteristic of subjects who had not had any recent teaching experience at the primary level (grade one, two, or three) to utilize more theoretical information than practical information. Of the subjects who exhibited this tendency in their planning, 53.8% had had no recent primary level teaching experience. The subjects who relied more on theory than on situational information were primarily people who had no children of their own (58.3%). These people tended to draw on general principles of teaching/learning more so than did subjects who had children of their own.

Most of the subjects who referred mainly to theoretical information had had four or more curriculum and instruction courses (83.3%), and had completed their most recent course less than two years ago (61.5%). This number of courses and recent coursework was characteristic of 65% of all of the subjects who participated in the study and not particular to subjects who preferred theoretical information over practical information. Those subjects who had university degrees were in the majority in the group of subjects who drew primarily on theoretical kinds of information (73.1%), and this emphasis on theory was typical of all subjects with degrees.

Although females comprised the majority of theoretically oriented subjects, they were not particularly theoretically oriented as a group. It was more typical of males to use theoretical information more often than practical information during their curriculum planning. The ages of most of the subjects who used predominantly theoretical information ranged from 26 to 35 years. It was characteristic of people in this age range and of people in the 46- to 55-year age bracket to rely on theoretical information more than on practical information.

It was also characteristic of people who preferred theoretical information over practical information not to have experienced a task similar to lesson planning analysis before using L-PLAN for that purpose: 84.6% of the theoretically oriented subjects had not previously experienced a similar task.

The personal reactions to L-PLAN of those subjects who used more theoretical information than practical information were generally positive: 65.3% of them felt interested or confident while going through the computer program, and 50% of them were pleased or satisfied with their performance on the computer after they had completed L-PLAN.

Subjects Who Focused on the Planning Situation

The 24 subjects (40.7%) who referred more often to situational information than to theoretical information during their curriculum planning also reflected the background traits that were predominant throughout all subjects: 66.7% had had more than two years of teaching experience; 80% had completed four or more curriculum and instruction courses, 91.7% within the past two years; 75% were female; 66.7% had not previously experienced a similar task; 58.3% felt interested of confident during their planning descriptions; and 50% were pleased or satisfied with their performance on L-PLAN. Although subjects who had had more than two years of teaching experience comprised the majority of the group who used more practical information than theoretical information during their planning, it was 15.2% more characteristic of experienced subjects to rely primarily on theoretical information. Similarly, although the majority of the subjects who relied on practical information had not experienced a similar task, it was more characteristic of people who had experienced a similar task to refer to situational information most of the time during planning.

Subjects who referred more often to practical or situational information than to theoretical information differed from those subjects who did the opposite in two background characteristics: 54.2% of them had taught at the primary grades; and 69.2% of them had children of their own. These subjects were fairly evenly distributed across all age levels, from 18 to 56 years.

The group of subjects who used mainly practical information was equally divided into people who had university degrees and people who did not have degrees. However, of the 37 subjects who had degrees, 51.4% used a preponderance of theoretical rather than practical information during their curricular planning.

Subjects Who Relied on Personal Experience

The 22 subjects (40.7%) who used their own personal knowledge and experience as a source of information 50% of the time or more during their planning exhibited all of the traits but one that were predominant among all subjects. Of the subjects who relied primarily on their own experience, 96.4% had had more than two years of teaching experience; 81.7% had completed their last curriculum and instruction course within the past two years; 68.2% were female; 72.7% had not experienced a similar task previously; 59.1% were interested or confident as they described their planning; and 54.5% were pleased or satisfied with their performance on L-PLAN.

Although the majority of subjects who relied on their own knowledge as their primary source of information during planning exhibited the characteristics noted above, reliance on personal experience was not necessarily typical of all people who possessed these traits. For example, it was more typical of subjects who had taken their latest coursework within two years to rely mainly on external information sources when planning curriculum. The same was true for subjects who had not experienced a planning analysis task previously and for subjects who registered positive feelings both during and after their performance on the computer program. Similarly, although 63.3% of the subjects who used their own knowledge as the basis for their planning decisions had univeristy degrees, most people with degrees (62.2%) referred to outside sources more than to their own experience.

Other traits characteristic of the subjects who relied mostly on their own experience during curriculum planning included teaching experience at the primary level (54.5%), no children (54.5), and fewer than four curriculum and instruction courses (72.7%). These subjects spanned the full range of ages, from 18 to 56 years and over, with the largest group in the 26 to 35 age bracket.

Subjects Who Provided Extended Planning Descriptions

Again, most of the 15 subjects (25.8%) whose planning descriptions extended beyond the average five cycles were characterized by traits predominant in the larger group of all subjects: more than two years of teaching experience (80%); four or more curriculum and instruction courses (100%); coursework within the last two years (73.4%); female (80%); no previous experience of a similar task (86.7%); and interest or confidence during use of the computer program (60%).

This group differed from the others in that most subjects were not pleased or satisfied with their performance after they had completed L-PLAN. Instead, they showed mixed feelings, ranging from disappointment to satisfaction.

Subjects who provided extended planning descriptions were primarily people with university degrees (66.7%), without children (60%), and with teaching experience at the primary level (60%).

Summary

Most of the background variables which characterized the majority of all subjects who participated in the study were also predominant in all groupings of subjects according to various aspects of their planning performance. These background characteristics included (1) more than two years of teaching experience; (2) coursework less than two years ago; (3) female sex; (4) no previous experience of a similar task; and (5) interest or confidence while using the computer program.

However, the predominance of these traits in every grouping of subjects according to planning characteristics does not necessarily indicate that these traits were predictive of those characteristics of planning. The trait most strongly related to a particular planning characteristic was possession of a university degree: subjects who had degrees, regardless of their other background characteristics, referred mostly to theoretical information during their curriculum planning, while subjects without degrees relied primarily on practical kinds of information. No background characteristic was strongly related to the tendency to rely on one's own knowledge and experience during planning more than on external sources of information, nor to the use of more than the average number of 4.4 cycles to explain curriculum planning processes.

SUBJECTS' EMOTIONAL REACTIONS

Data were gathered on the strength and nature of subjects' emotional reactions to the task of describing and analyzing their curriculum planning processes via the computer program. In the last two questions of Section Two of L-PLAN, subjects were asked to describe the feelings they had experienced while using the computer program and their level of satisfaction with their performance on the computer program.

A positive response of "Interested" or "Confident" was expressed by the majority of subjects (67.8%) for the first of the two questions. This positive reaction to the computer program was prevalent among subjects regardless of the nature of their teaching experience or professional preparation, and regardless of whether or not they had children of their own or had experienced a similar task previously. Factors which did appear to relate to subjects' emotional reaction to the experience of using the computer program were age, sex, and possession of a university degree. Younger subjects were less confident while using the computer program: 32.3% of the 18- to 25-year-olds were "Interested" or "Confident," compared with 66.7% of the 26- to 35-year-olds and 75% of the 36- to 45-year-olds. Younger subjects tended instead to be "Uncertain" or "Neutral" about the computer program (67.9%). Another factor related to confident feelings while using the computer program was sex: more males (79%) than females (57.5%) described themselves as "Confident" or "Interested" during the computer program. Also, a response of "Confident" or "Interested" was more characteristic of subjects with univesity degrees (70.3%) than of subjects without degrees (54.5%).

In describing their level of performance satisfaction, 49.2% of all subjects described themselves as "Satisfied" or "Pleased" with their performance on the computer program. These feelings were expressed by subjects regardless of the nature of their professional preparation or level of teaching experience. The background variables which were related to positive emotional responses on this measure were sex, possession of a university degree, age, previous experience of a similar task, having children, and length of teaching experience. Feelings of satisfaction or pleasure characterized subjects in these groupings to the following extent: males 68.4%, compared with females 40%; subjects with degrees 56.7%, compared with those without degrees 36.3%; subjects who had experienced a similar task previously 60%, compared with subjects who had not experienced a similar task 45.4%; subjects who had children 59.1%, compared with subjects who did not have children 40.6%; subjects who were 25 to 36 years old 64%, compared with other age groups who expressed a variety of feelings ranging from satisfaction to dissatisfaction; subjects who had taught for two to five years 66.6%, or six to ten years 50.1%, compared with those who had more than 11 years of experience 38.9%, or less than one year of teaching experience 41.6%.

In summary, all groupings of subjects, except the 18- to 25-year-olds, described having felt mostly "Confident" or "Interested" during the computer program. These feelings were characteristic of 64% of all subjects. An additional 31% felt "Neutral" or "Uncertain;" and 5% felt "Apprehensive." After completion of the computer program, 49% of the subjects expressed feelings of satisfaction or pleasure with their performance. Subjects who did not express these positive feelings were either "Neutral" (20%), "Disappointed" (14%), or "Dissatisfied" (17%).

EXPERTS' PLANNING PERFORMANCES

Five experts in the areas of curriculum and language arts were included in the study in an attempt to define a preferred or "expert" curriculum planning strategy against which the planning procedures of the other 59 subjects could be compared. No such strategy was evident in the performances of these experts. On the contrary, the experts varied widely among themselves in their planning procedures, and overall, they performed in a manner similar to that of the other 59 subjects.

Information Search

The five experts' search for information related to the planning task was primarily self-oriented: experts relied on their own professional knowledge and experience 55% of the time and on external information sources the remaining 45% of the time. Information gathered from both internal and external sources was primarily practical (60.9%). Experts' modal planning strategy involved reflecting on the pupils described in the planning task, relying on their own personal knowledge in order to identify pertinent pupil characteristics. The average number of cycles used by experts was four cycles. These same attributes of information search characterized the planning procedures of the other 59 subjects in the study.

Information Utilization

Experts used in their plans all the pieces of information they described via the computer program except one piece. In one case, an expert described considering an alternate idea for a learning activity and then discarding it in favor of his originally intended activity. There was, however, a large amount of information (50% more) evident in experts' plans which they had not described while using the computer program. Of this additional information, 55% was practical in nature, and 45% was theoretical. Experts made no modifications to their original plans, either during or after the description of their planning processes.

Curriculum Plans

Most experts' lesson plans (three out of four sets of plans) showed a high level (75% or above) of internal consistency, inter-lesson consistency, and external consistency. One expert produced a plan too brief to be included in this measure. Only one set of plans fell below the 35% level on one measure of consistency, namely on inter-lesson consistency.

Summary

The planning processes described by the experts in this study were similar to those described by the other 59 subjects with respect to major characteristics of information search and utilization, and variety of planning strategies. Experts differed from other subjects in the proficiency with which they used the computer program to describe and analyze their planning processes. Reinterpretation was necessary for 21.4% of the adjusted total of experts' responses, compared with 15.9% of other subjects' responses. This figure was due mainly to the tendency of one expert to use open-ended responses, and to a highly abbreviated planning description given by a second expert.

CHAPTER SIX

SUMMARY, DISCUSSION, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

The purposes of this study were twofold: (1) to ascertain the extent to which it was possible to obtain from classroom teachers accurate descriptions of their deliberate preactive curriculum planning processes and some indication of their intuitive planning processes using the instruments developed for this study; and (2) to identify and describe the preactive curriculum planning procedures used by a group of experienced and prospective classroom teachers according to characteristics of their search for information, their use of information, and the curriculum plans they produced.

SUMMARY OF PROCEDURES AND FINDINGS

Curriculum planning was treated as a particular type of problem solving. Theory and research in problem solving provided a framework for the development of a computer program which was used to guide the retrospective self-analysis of curriculum planning by a group of classroom teachers. Fifty-nine prospective and experienced classroom teachers were presented with a curriculum planning problem in a simulated elementary school setting and were asked to formulate a set of written curriculum plans. Within four days after they had made their plans, subjects used the computer instrument, called "L-PLAN," to assist them in developing a retrospective description of the curriculum planning they had recently carried out. Both the planning descriptions and the written plans were analyzed in terms of the purposes stated for this study.

Validity and Reliability of the Instruments

It was found that it was possible to secure an accurate description of subjects' conscious curricular deliberations 98.5% of the time using the computer instrument described in this study. Of these descriptions, 81.8% were recorded exactly as they were provided by subjects, and 16.7% required minor translations by the researcher. For the main part of this study, the computer instrument was used by subjects with similar results on eight different occasions. Of 60 experienced and prospective classroom teachers and five curriculum specialists who participated in the main study, 59 teachers

(98.3%) and all five specialists used the computer instrument successfully to explain their curriculum planning processes. Indications were that subjects' emotional reactions to the computer instrument did not adversely affect their performance.

An indication of the kinds and amounts of information subjects dealt with subconsciously during their curriculum planning was obtained by using the "Analysis of Written Curriculum Plans" form to examine subjects' written curriculum plans. An inter-judge reliability of 79.5% was established in the use of this instrument. Using the instrument, it was found that overall, subjects' plans were consistent with 40.8% more information labelled according to category than had been described using the computer instrument. This finding implied that those planning criteria which had been met in the written plan and had not been described explicitly by subjects were applied subconsciously.

Subjects' Information Search

The search for information carried out by the 59 subjects during their curriculum planning was described in terms of the information sources they consulted, the amount of each kind of information they gathered, and the sequences or patterns evident in the activities, purposes, sources, and kinds of information used by subjects during their planning processes.

It was found that subjects relied on their own previous experience and store of knowledge 35.8% of the time, more than on any other single source of information. However, subjects relied on their own knowledge only after they had considered pertinent practical information inherent in the planning situation they faced. Subjects described having considered practical kinds of information 53.2% of the time, and theoretical kinds of information 46.8% of the time. Although subjects tended to gather predominantly practical information in the early stages of their curriculum planning and to consider mainly theoretical information later in their planning processes, they did not focus exclusively on either kind of information at any stage, but tended to consider both kinds alternately.

The particular type of practical information subjects considered earliest and most frequently in their planning was information about the pupils for whom their plans were intended. Although subjects described beginning their deliberations 44.1% of the time with consideration of the pupils for whom they were planning, there was no identifiable pattern in succeeding planning behaviors, regardless of starting point. The modal behaviors exhibited during curriculum planning by subjects in this study involved reflecting on the particular pupils for whom curriculum was being planned, relying on the teacher's own perception of the pupils, and trying to identify the salient characteristics of these pupils as learners. This particular procedure, however, was used only eight out of a possible 262 times (3.1%) by eight different subjects. Lack of pattern or commonality in curriculum planning strategies was noticeable across all subjects, including the curriculum specialists.

Subjects' Information Utilization

A description of the use subjects made of the information they gathered during their curriculum planning was obtained by examining how much information was gathered and not used in the plans, how much information was evident in the plans and not described in the computer program, and how much information was modified during some stage of the planning processes.

Subjects' rate of information use was quite high: 96.1% of the information sought during planning was incorporated into the plans. Subjects used in their plans not only the majority of the information they had described using the computer instrument, but also an additional 40.8% which they had not described when working through the computer program. Subjects made modifications to their original plans either during or immediately following the computer program only 3.4% of the time.

Subjects' Written Plans

The written curriculum plans which subjects produced were examined using as criteria measures of internal consistency, inter-lesson consistency, and external situational and theoretical consistency. The average level of internal consistency evident in plans was 60.3%, of inter-lesson consistency 50%, of external consistency with the planning situation was 57.9%, and of external consistency with relevant theory was 60.9%. There was little relationship between a plan's overall level of consistency and the description of the planning processes which had been used to produce it.

Subjects' Background Characteristics

Biographical and demographic data on subjects was gathered and examined for possible relationships with salient characteristics of the planning processes. The background characteristic which was found to be most strongly related to the nature of subjects' planning descriptions was the possesssion of a university degree. Regardless of the length or level of subjects' teaching experience, of their age or sex, of how recently they had completed coursework or whether or not they had children of their own, subjects with university degrees tended to use more theoretical principles about teaching/learning in their planning and to consult more external information sources than did subjects without university degrees.

Subjects' Emotional Reactions

Most subjects (67.8%) reacted positively to the computer program, expressing feelings of confidence or interest while using L-PLAN to describe and analyze their curriculum planning processes. In addition, many subjects (49.2%) described satisfaction or pleasure with their performance on the computer program. These findings suggested that subjects' descriptions and analyses of their planning processes were not adversely affected by their emotional reactions to the use of the computer.

DISCUSSION

Problem Solving as an Orientation Toward Classroom Classroom Curriculum Development

The results of this study have confirmed that it is useful for the purposes of description to conceive of classroom curriculum decision making as a process analogous to a particular type of problem solving in which the problem is viewed as a "problem to find" rather than as a "problem to solve" (Polya, 1945). The virtue of this conception is not that it provides an alternative model for curriculum development at the classroom level, but that it encourages a more flexible orientation toward classroom curriculum development than does the traditional model for curriculum development. Although proponents of various problem solving models describe a series of steps, the sequence of these steps is not fixed (Dewey, 1933), as it appears to be in the traditional model for curriculum development. A flexible orientation may contribute more to understanding the phenomena of classroom curriculum development than has the traditional model, and as a result, it may enable encouragement or improvement of particular curriculum planning processes.

The stimulus to accept more than one potentially successful classroom curriculum development model originates in research which has revealed that, in practice, many different classroom curriculum development strategies are used with no appreciable effect on the quality of the end product, namely, curriculum plans. The particular problem solving orientation toward curriculum development adopted in this study, in which curriculum planning is likened to addressing a "problem to find," not only tolerates, but encourages diversity in planning strategies. This is so for the following reason: the distinctive feature of a "problem to find" is that it is difficult to prespecify the exact nature of the desired solution or plan. Thus, the direction to be taken in addressing the problem is not a function of the nature of the problem, as it is for a "problem to solve." In fact, it is impossible to prescribe for any given "problem to find" what the most appropriate problem solving procedure will be. A variety of strategies must often be attempted, and it is possible that more than one strategy may be appropriate for a given curriculum planning problem.

The applicability of this conception to classroom curriculum development is apparent. For the classroom teacher, the exact nature of the end goal is not always known. Regardless of how clearly or carefully curriculum goals have been defined for him outside the classroom, in order for those externally-set goals to be appropriate for a particular group of children, the classroom teacher must often redefine, or at least refine, the goals in relation to the particular needs, capabilities, and interests of his particular group of pupils, and in keeping with the restrictions and potentials of his particular curriculum setting. This situation has been confirmed by Miel (1973):

> At best, the given curriculum is a resource for teachers and children. Whether a teacher is handed a closed or an open curriculum, further planning is called for at the classroom level to adjust it to the children [p.109].

The need to refine broad curriculum goals to dimensions appropriate to particular groups of learners is further reflected in Goodlad and Richter's (1966) widely accepted distinctions among "societal," "institutional," and "instructional" level goals. This situation was also evident in the performances of subjects in this study.

Given as their planning task the broad curriculum goal, "To increase pupils' powers of descriptive language," subjects proceeded to adapt this goal in an attempt to suit the ability levels of the pupils for whom they were planning. Most subjects (76%) set explicit intermediate goals of smaller scope which were considered to contribute to the end goal, "powers of descriptive language." Some examples of these intermediate objectives were "to be able to describe orally sense experiences with actual objects;" "to develop the ability of students to describe objects accurately in writing by means of a category system of attributes;" and "to develop the children's ability to perceive individual elements of the world around them and to select the most significant elements from it." The appearance of these objectives suggests that subjects were faced with a "problem to find," and were attempting to make that problem more manageable. The use of a wide variety of planning strategies by subjects also suggests a "problem to find." As a group, subjects used many different strategies in addressing their goal, and many of these resulted in equally appropriate curriculum plans.

Implications for the Traditional Model for Curriculum Development

The findings of this and other studies challenge the adequacy of the traditional model for curriculum development at the classrooom level. In spite of the prescriptions in the traditional curriculum development model for linearity and selection from among preset alternatives, these features were not characteristic of the planning strategies used by subjects in this study. Although subjects succeeded in describing their planning procedures in terms of the elements specified in the traditional model (that is, lesson objectives, curriculum content, instructional resources, teaching methods, and pupil evaluation), they differed in the relative emphases given various elements and in the sequences in which various elements were considered. Some subjects repeatedly considered one element before going on to the next; some considered the same element more than once at different times; and some subjects indicated that they had considered two or more elements simultaneously.

The differences in the planning strategies used by subjects--and experts--were more marked than were the similarities. Examination of subjects' descriptions of their planning processes showed that the most commonly occurring behaviors appeared only 3.1% of the time. Nowhere was one subject's entire sequence of planning behaviors, his planning strategy, replicated by another subject. Similarly, wide variations in choice of problem solving strategies were observed among subjects addressing the same problem under identical circumstances by Bruner, Goodnow, and Austin in their _Study of thinking_ (1956). More recently Pylypiw, (1974), interviewing 40 elementary school social studies teachers, found that the traditional linear model for curriculum development was not as widespread as had been thought. Variations on the linear model were also observed by McClune (1970) in his analysis of the planning practices of 25 elementary school teachers who responded to a curriculum development questionnaire, and by McClure (1965) among the three elementary school faculty groups whose curriculum planning activities he monitored.

Moreover, decision making by the subjects in this study was not, as prescribed by the traditional model for curriculum development, simply a matter of selecting from among a range of readily available alternatives. The classroom teachers who participated in this study preferred to generate from their own backgrounds and experiences a large proportion of their curriculum plans, rather than to select parts of their plans from preset alternatives. The 59 subjects in this study relied on their own experience and knowledge 35.8% of the time, and consulted another classroom teacher 8.7% of the time. This reliance on personal resources a total of 44.5% of the time was contrasted with reliance on print resources only 24.2% of the time. These findings are supported by the results of other studies. For example, Gardner (1971) found that the 30 classroom teachers whose curriculum planning needs he surveyed generated from personal resources a large portion of their curriculum plans, and also used fellow grade teachers as one of their three most frequently consulted sources of help during curriculum planning. Goodlad and Klein (1974) also observed a large amount of reliance on teachers' own experience in curriculum decision making in the 150 classrooms they visited.

The findings of this study support the contention that classroom teachers approach curriculum planning not according to a prespecified set of procedures for selecting the most appropriate of a number of preset alternatives, but as a "problem to find." In developing curriculum for the classroom, teachers often restate or refine their plan objectives, and they proceed with the task using a wide variety of planning strategies.

Guidelines for Curriculum Planning within the Problem Solving Orientation

The acceptance of a variety of potentially successful curriculum planning strategies creates a need for a system of classifying and eventually validating different kinds of planning strategies. Given this orientation, it is not sufficient to describe or validate a planning stragegy by referring to a particular sequence of procedures prescribed by the traditional model for curriculum development, namely, setting learning objectives, then selecting suitable content and resources, then organizing learning experiences, and finally establishing evaluation procedures. Although these particular tasks have to be accomplished, this study has suggested that these tasks are not necessarily sequentially related and that there is a variety of ways to accomplish them.

In this study, a framework for describing the multiple strategies used by classroom teachers in developing classroom curriculum was constructed with elements from two sources: practical characteristics of the planning setting, and theory relevant to the planning task. Categories of information drawn from these two sources were successfully used by subjects to describe their curriculum planning strategies. As reported earlier, subjects' considerations during curriculum planning were based almost equally on practical and theoretical kinds of information, with slightly more emphasis given to the former. These two sources, the practical and the theoretical, were also used to construct a set of criteria for validating subjects' written curriculum plans. It was found that these criteria provided a reliable measure of the consistency levels in subjects' written plans.

Competencies Required for Classroom Curriculum Development within the Problem Solving Orientation

It is suggested that the skills required for competent use of L-PLAN are the same skills required for competent development of classroom curriculum. These skills include the ability to (1) understand important concepts and generalizations pertaining to teaching/learning; (2) perceive accurately the parameters and salient features of specific teaching/learning situations; and (3) translate and apply the appropriate concepts and generalizations to the demands and restrictions of particular teaching/learning situations. It was the purpose of this study to investigate these widely applicable curriculum development competencies in the curriculum planning processes of experienced and prospective classroom teachers.

Because these competencies cannot be observed directly, they were investigated in this study via subjects' observable planning behaviors and written curriculum plans. The behaviors associated with these competencies which were examined in this study were (1) searching for various kinds of information, both general and specific; and (2) using information in writing curriculum plans. The first of these kinds of behaviors was assumed to be associated with the first two planning competencies listed above, and the second kind of behavior was considered an indication of the third planning competency.

Indications of subjects' information search behaviors were obtained from subjects' own descriptions of their planning processes, which they gave using the computer program, "L-PLAN." Using these indicators, it was found that subjects devoted a major part of their energies (53.2%) to considering the particular requirements of their planning situation. They spent almost as much time (46.8%) considering general principles related to their planning task. Subjects thus did not appear to slight one kind of information referent in favor of the other.

However, subjects demonstrated less proficiency in applying information than in gathering it. Descriptions of the use made of information gathered were obtained by analyzing subjects' written curriculum plans according to criteria based on salient practical features of the planning situation and on theoretical considerations relevant to the planning task. Plans were examined for consistency with relevant theory from the areas of philosophy of education, sociology of education, educational psychology, and curriculum, and for consistency with practical information about the particular group of pupils and the particular setting involved. It was found that 34 sets of plans (57.6%) which were consistent with general principles of language competence, teaching/learning, or peer interaction were not entirely appropriate to the particular abilities and experience levels of the pupils involved. In these cases, subjects had not succeeded in applying appropriate generalizations to the demands of the teaching situation.

The descriptions of curriculum planning processes given by subjects who participated in this study suggest that they tended to use one of two alternate processes in deliberating about their curriculum task. Most subjects (62.7%) described a planning process which entailed successive concatenation of diverse pieces of information. These were subjects who consulted a wide range of sources about a variety of topics with many different concerns in mind. In a relatively longer average period of deliberation (4.6 cycles, compared to 4.3 cycles for other subjects), they succeeded in arranging these bits of information into a plan for teaching the task of description. The other 22 subjects (37.3%) seemed to approach their task of curriculum planning with a particular mind-set and to supplement their own ideas with a minimum of information from outside sources. These subjects averaged a slightly shorter planning period (4.3 cycles) and referred to their own experience and knowledge 50% of the time or more.

Both these strategies suggest that subjects were using a generate-and-test model (in the sense described by Newell and Shaw, 1972) instead of heuristic processes during their curriculum planning. Paying little attention to the nature of the processes they used in constructing their curriculum plans, subjects implied that the appropriate means of validating their plans was by implementing them and noting pupil and teacher reactions. However, as suggested earlier in this study, reference to the ultimate criterion of pupil outcome presumed to result from plan implememtation has proved unfruitful as a means of judging the effectiveness of teacher behaviors and of the decisions which led to those behaviors.

In addressing "problems to find," such as are encountered in curriculum planning, it would seem necessary to focus attention on the planning process itself. Procedures that can usefully be employed for curriculum planning have been pointed out in the literature. Polya (1945) advocated analyzing a task in its component parts; Wertheimer (1945) emphasized seeing the relationships among the parts of a problem situation; and Shulman (1974) observed medical doctors screening each piece of incoming information in relation to a tentative hypothesis advanced to guide diagnostic decision making. In the two processes apparently used by most subjects in this study, there was no evidence of screening, comparing, analyzing, or reconsidering various pieces of information: there were only two instances out of 262 in which subjects described having changed or modified an intention regarding their plans on the basis of further information found. Subjects did not seem to focus on the relationships which existed among the pieces of information they gathered. This may have been their nemesis. As Neisser (1963) has suggested, a grasp of the relationships among the various parts of a problem is crucial to "productive thinking," in Wertheimer's terms. Support is lent to this suggestion by McClure's findings (1965) that the best curriculum plans were produced by teachers who succeeded in connecting general statements from the literature with information about the children presently in their classes.

A further interesting characteristic of the plans produced by the subjects in this study was their emphasis on the teacher. Of 59 plans, almost all were teacher-oriented or completely teacher-directed, in spite of the overwhelming emphasis on pupils recorded by subjects on the computer program. One possible explanation for this plan characteristic may be, as Goodlad and Klein (1974) found in the classroom teachers they observed, that subjects were not adept at meeting the needs of particular pupils, or did not perceive it as a high priority, and so relied on their own preferences and expertise as their major point of reference. Another explanation for the discrepancies between subjects' planning descriptions and the plans they produced may lie in the levels of awareness with which some considerations were made. It may be that some portion of subjects' curriculum planning was subconscious or intuitive. In this study, 40.8% of the information which apparently contributed to subjects' written curriculum plans was not described by subjects as part of their conscious curriculum deliberations. Subconsciously, subjects may have given priority to their own preferences and expertise instead of using it to determine how best to fulfill the needs of pupils.

The suggestion that the influence of subjects' own characteristics operating at the subconscious level were more powerful than were conscious considerations of pupils' needs is supported by other studies of classroom curriculum development. McClune (1970), using data gathered from 47 elementary school classroom teachers via questionnaire, found that teachers characterized their curriculum planning practices as primarily pupil-oriented rather than teacher-oriented. As in the present study, teachers thought they were giving highest priority to pupils' needs. Pylypiw (1974) talked with 40 elementary school social studies teachers individually and succeeded in uncovering through in-depth interviews the importance of teacher preferences and expertise as major determiners of curriculum plans. Jeffares (1973), using a detailed content analysis of the curriculum plans of 21 elementary school social studies teachers, found evidence that teacher preferences were only slightly less important in curriculum planning than were pupil needs: teacher characteristics and pupil characteristics ranked fourth and third respectively as salient factors in subjects' curriculum plans.

These findings suggest that it is important that classroom teachers plan with full awareness of the implications of their planning processes. This awareness would seem essential to the competent execution of the professional responsibility for curriculum development which has been given to the classroom teacher. As Skemp (1971) has explained,

> It must be admitted that the intuitive leap is a frequent forerunner of the deliberate generalization, suggesting a direction which might otherwise have remained unexplored. But intuition sometimes 'lets one down.' That is, when subjected to critical analysis, weaknesses are found--inconsistencies with accepted ideas, which make true assimilation to existing (and well-tried) principles impossible [p.61].

Summary

In advocating a framework for classroom curriculum development based on theories of problem solving, this study has questioned the adequacy of the traditional curriculum development model for classroom curriculum planning. It has proposed a more flexible orientation toward classroom curriculum development than the traditional model permits.

It has advocated a focus on planning processes rather than on the outcomes of plan implementation. It has encouraged the use of heuristic rather than linear planning procedures. It has suggested possible sources of guidelines for heuristic planning. It has provided a framework for describing heuristic curriculum planning. And it has offered a set of criteria for validating written curriculum plans.

CONCLUSIONS

The following conclusions have been drawn from the data provided by the 59 experienced and prospective classroom teachers who participated in this study. They are based on the examination and interpretation of the curriculum planning and plans of these 59 subjects.

This study has demonstrated a workable method of describing the curriculum planning carried out by classroom teachers. The main features of this method were (1) a stimulus task set under conditions which simulated planning conditions found in a typical suburban elementary school; (2) retrospective self-analysis of curriculum planning processes by teacher-subjects; and (3) descriptions by the researcher of subjects' planning procedures according to characteristics of information search and information utilization, with reference to the theoretical or practical nature of the information involved. The instruments used in securing the descriptions were a computer-assisted program for planning analysis and a set of criteria for analysis of written curriculum plans. These have proved to be valid and effective research instruments. It was tentatively concluded after using these instruments that the methodology of which they were a part can reveal not only characteristics of curriculum planners' planning procedures, but also gross characteristics of the processes underlying those procedures.

Subjects in this study used a wide variety of information gathering and utilization strategies during their curriculum planning. Although some modes of behavior, some purposes for information search, some information sources, and some types of information were used more frequently than others by subjects as a group, these elements were combined in so many different ways that few commonly shared planning patterns or strategies were identifiable. Variations in planning strategies were related to subjects' possession of a university degree, but showed no systematic effect on the consistency of the curriculum plans produced. It was tentatively concluded from these data that the appearance of a wide variety of curriculum planning strategies was due to the nature of curriculum planning tasks: they function as "problems to find" and are appropriately addressed using a variety of strategies.

Analysis of the curriculum plans produced by subjects in this study showed that the aspects of plans most often neglected were definition of curriculum content and provision for pupil evaluation. Although a great majority of subjects' plans included explicitly stated objectives and well organized learning activities which were consistent with the curriculum goal, many of these objectives and activities were found to be inconsistent with the ability levels of the pupils for whom the plans had been designed. From this it was tentatively concluded that many subjects had failed to apply general theoretical principles appropriately to the practical requirements of the planning situation.

It was also noted in analyzing subjects' written curriculum plans that most plans were primarily teacher-oriented in spite of the primary focus on pupils described by subjects during self-analysis of planning processes. On the basis of these findings and findings made in other studies, it was tentatively concluded that subjects, uncertain of how to tailor their plans to suit the abilities of the pupils involved, or not desiring to, allowed their own preferences to determine the shape of their plans and that this was done by subjects subconsciously or intuitively.

IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The statements of implication made in this section are limited to the extent that they are based on data provided by a non-random group of 59 prospective and experienced classroom teachers.

Implications for Teacher Educators

In this study, the requirements for competence in classroom curriculum planning were defined as (1) the ability to understand general principles which pertain to teaching/learning; (2) the ability to analyze important features of a particular planning situation; and (3) the ability to apply appropriate generalizations to all of the requirements of the planning situation. Insofar as the curriculum plans produced by subjects in this study indicated failure to master particularly the last of these three requirements, it is suggested that teacher educators endeavor to develop in prospective teachers the process of applying generalizations in a variety of specific situations. Unfortunately, as Daniels (1975) and Dewey (1933) before him pointed out, this process cannot be taught, but only facilitated. Daniels suggested that the ability to apply theoretical principles is a function of being oriented toward relevant data (theoretical and practical), understanding that data, and having the inclination to use the data. Daniels said that procedures for orienting oneself toward various data can be taught, even though the process of applying data cannot. Therefore, it would seem appropriate for teacher educators to develop in prospective teachers data gathering and diagnostic skills related to pupils and to planning settings, and awareness and understanding of theoretical principles related to teaching/learning.

While data gathering skills and diagnostic skills can be taught fairly directly, understanding theoretical principles is more complex. It has been suggested in this study that understanding and operationalizing theory requires a three-step translation process: descriptive theoretical statements must be understood, then translated into prescriptive statements, and finally translated into statements of implication for teacher behavior. An example of this translation process would be (1) pupils learn best when they are successful at a task; (2) teachers should ensure pupil success as often as possible; (3) therefore, teachers should diagnose pupils' abilities and interests so as to be able to set tasks at which pupils can succeed. As with the process of applying theory, this prior process of translating theory into operational terms cannot be taught, but only encouraged. Teacher educators should provide examples and opportunities in such translation for prospective teachers.

Three further implications for teacher educators are suggested by the data from this study. Given the heavy reliance of classroom teachers in this study on their own and their colleagues' personal experience, it would seem advisable for teacher educators to equip prospective teachers with a large repertoire of teaching strategies and an informed awareness of curriculum materials available commercially. These skills and awarenesses would provide a rich store of alternatives to draw from during curriculum planning. Teacher educators should encourage and provide opportunity for critical assessment of the methodological and instructional alternatives most appropriate for a given curriculum plan. They should also encourage and provide opportunity for preactive reflection on the entire curriculum plan. Most subjects in this study reported no previous experience in reflecting on their curriculum plans before using them, and perhaps because of that inattention, failed to notice some inconsistent aspects of their plans. Lastly, the neglect of evaluation measures and curriculum content in subjects' curriculum plans suggests that teacher educators should include in the curriculum component of teacher education programs, along with subject area methods courses, methods of curriculum planning _per se_, with emphasis on the neglected skills of determining evaluation procedures and defining curriculum content.

The use of L-PLAN can facilitate the implementation of these recommendations for teacher educators. In an instructional capacity, L-PLAN can provide the opportunity for intending teachers to practice curriculum planning competencies in a controlled setting. Variety in teaching settings can be achieved by substituting statements appropriate to other subject areas in addition to language arts, and by focusing on one or more aspects of pupil characteristics.

It is evident from the use of L-PLAN in this study that the instrument has reached near-final stages of development, and that it is potentially useful for a variety of purposes, both instructional and research-related, in its present form. Alterations suggested for the final stage of development of the instrument include (1) reiterating in the introductory material the purpose of the instrument, namely to encourage reflection on the reasons for curriculum decisions taken, as well as on the nature of those decisions; and (2) substituting the choice "Another elementary school teacher" for the choice "Friend" in the alternatives provided under the question about information sources consulted.

Implications for Classroom Teachers

These last three implications suggested for teacher educators can also be directed toward teachers already in the classroom, who are responsible for their own professional development. It is recommended to the classroom teacher on the basis of this study that he attempt to expand his repertoire of teaching strategies and his knowledge of available instructional resources, that he take time to reflect critically on the planning he has done before he carries it out with pupils, and that he direct his attention in particular toward the evaluation and curriculum content aspects of his plans.

An additional implication of this study for the classroom teacher is that he should make explicit as much of his curriculum planning as possible in order to avoid such inconsistencies between intention and action as were found among subjects in this study.

Recommendations for Further Research

The suggestions made in this section are based on an acceptance of a need to understand more about the wide variety of strategies and about the reliance on personal knowledge and experience which characterized the curriculum planning of the subjects in this study and probably characterize the curriculum planning of classroom teachers in general. These suggestions are also based on a belief that the most appropriate route to follow toward this goal at this time is that recommended by Schwab (1969), namely that curriculum research should proceed in descriptive empirical modes rather than with traditional experimental designs.

Having established the viability of the computer instrument, "L-PLAN," and of the criteria for curriculum plan analysis in one particular context, it would seem appropriate to carry out further studies with these instruments in which carefully selected stratified samples of various populations are systematically exposed to a series of curriculum planning tasks differentiated according to subject area, grade level, type of pupils, time allowed for planning, resources available, and amount of theoretical and practical information provided. Such studies may reveal how pervasive particular planning strategies are across different subjects and tasks, and what aspects of the planning task affect the use of certain strategies by particular subjects. The selection of subjects to comprise the various samples for such comparisons could be made on the basis of psychological, sociological, emotional, and personality variables known to correlate with problem-solving behavior, for example, cognitive complexity, propensity for risk taking, frustration level, reflectivity, self concept, attitude, and role expectations.

In addition to varying subject and task characteristics, it would also be valuable to carry out separate investigations of the processes underlying curriculum planning as construed in the present study. Some of the components identified as part of planning processes which warrant further study are a grasp of theory, the ability to translate descriptive theoretical statements into operational prescriptions for planning and teaching, and proficiency in gathering and analyzing practical information inherent in the planning situation. Studies of these components would be subject to the limitations inherent in any study of unobservable mental processes. One possible design for such a study might be to set a curriculum planning task of the same nature as that used in the present study, to allow subjects opportunity to formulate some plans, and then to request a revision in subjects' plans in light of additional contradictory information provided about the planning situation. Such a study might reveal subjects' grasp of relevant theory and their ability to derive a variety of appropriate applications from it.

Another possible avenue for investigating the mental processes involved in curriculum planning might be to focus exclusively on the strategies used by subjects during their planning. A number of procedures in addition to retrospective self analysis and examination of written plans, such as detached observation by the researcher, monitoring processes while they are occurring, or in-depth interviews of subjects, could be used to provide simultaneous checks on the same instance of curriculum planning. Additional information about subjects' planning processes might be obtained by measuring other process indicators, such as time required, efficiency in use of time and information, use of tentative hypotheses or randomness in treating information, and emotional states associated with planning processes.

Eventually, the relationship between planning and teaching must be explored in order to identify empirically the importance of explicit preplanning, and to discover the relationship, if any, between characteristics of planning and characteristics of the subsequent instruction based on that planning.

CONCLUDING STATEMENT

This study has shown that curriculum planning as carried out by the classroom teachers who participated in this study was a complex and multi-faceted process. Some indicators of the planning processes used by subjects which were described and analyzed in this study were characteristics of information search, characteristics of information utilization, and consistency levels of the resultant written curriculum plans. The computer-assisted planning description instrument and the criteria for analyzing written curriculum plans which were developed for this study have proved to be useful tools in securing these descriptions and analyses. Many avenues for further research into the nature and correlates of curriculum planning processes have been suggested and it is hoped they may eventually contribute to increased planning competence by the already-heavily-burdened classroom teacher, on whom rests a major responsibility for curriculum development.

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APPENDIX A:
PRESENTATION OF THE
SIMULATED CURRICULUM PLANNING TASK

TEXT OF VERBAL PRESENTATION

Description of the Planning Task

The task which you are to fulfill is the following.

> Plan a series of three lessons which are intended to develop pupils' competence in the use of descriptive language.

Parameters of the Task

A group of pupils whose language competence is to be developed will be described to you. Treat them as if they were your own class. They will be new to you. Plan from the beginning of whatever language program you would implement with them.

Plan in detail the first lesson you would carry out with these pupils to accomplish the task. Include a description of the activities and arrangements involving pupils and teacher which an outsider would see if he observed the lesson.

Consider how this first lesson would relate to a larger unit on descriptive language. Include a brief description in outline form only of the next two lessons to follow this first one.

There is no specified or preferred format for your plans. Plan as you normally would in preparation for teaching. Explicit plans will facilitate your performance later in the study.

Context

You have been hired mid-year to replace a female, grade two teacher whose husband's company has transferred him to a new location. You will take up your new post immediately after the Christmas holidays.

Pupils

You have met the previous teacher briefly and she has made available to you her summary of pertinent information from her pupils' cumulative record cards. These student profiles are being distributed to you now.

The previous teacher has also discussed with you the first lesson she recently gave in a unit on descriptive language. She suggested you carry on with that unit because it has already been started and because it is a topic usually covered in grade two. The lesson given was based on the four seasons of the year. Colored transparencies of a typical scene from each season were shown to the pupils and discussed. A description of this lesson, including children's responses given during the discussion, is being distributed to you now.

At the end of this lesson, the teacher gave the following assignment: "Write a story pretending you are a tree. Tell what you see and hear in winter." The stories which pupils wrote in response to this assignment are being distributed.

You may take some time to look over the materials you have received. Then you will see scenes you observed when you visited your new classroom on a number of different mornings before Christmas.

[After subjects had finished perusing the materials distributed, 42 colored slides of the pupils described were shown, with the following comments from the researcher.]

This is Adele. The teacher told you that she tries awfully hard, but does not seem to make much progress [Slide 5].

The boy in the brown jeans is Eddie. The teacher said he is a fighter. Other pupils always complain that he bothers them [Slides 21-26].

The teacher also mentioned a child named Andrew and said that he is often shy and withdrawn. She narrated the following incident as an example of his behavior. One day, the children were all at the back of the classroom, examining Indian artifacts. Andrew, feeling left out, quietly slipped back to his desk unnoticed by the teacher and began crying. The children saw him and brought him back to the group. They then proceeded to spoil him by passing everything to Andrew before anyone else could see it.

Community Setting

The school at which you will teach is located in a suburban residential area about 10 miles from a large metropolitan center. Most of the community's inhabitants work in the metropolitan center. It is a solidly middle class community, ranging from lower middle class to upper middle class. The houses are well-kept and plain.

There is a community center next to but separate from the school. The center is run by the people in the neighborhood and it receives a great deal of use all year. It appears to be well-managed.

The community is not politically active. There have been no sharp divisions of interest on political issues. Parents show an interest in the school; and parent attendance at yearly parent-teacher conferences is very good.

The School

Physical plant. The school itself is a relatively small, 11-room elementary school which was built about six years ago. It is a one-story building, laid out in an L-design, with offices and teachers' lounge at the junction of the two wings. It has all the facilities typical of schools in this system: a gym, a large playground, a library, and a nurse's room. It is well-supplied with paper and art materials and it has duplicating equipment, a 16mm film projector, a television, two overhead projectors, four cassette tape recorders, and three filmstrip projectors centrally stored for shared use. In addition, each classroom has its own filmstrip viewer and record player.

Organization. The school follows the organizational pattern typical of elementary schools, with one teacher per grade, with the exception of one split class. The school has one of each of the six elementary grades, plus a split grade four/five and a Learning Center for learning disabled children. A local parent-cooperative kindergarten uses one room, and one room serves as a music room.

Staff and administration. The staff of the school is headed by a principal who has teaching duties in addition to his administrative responsibilities. There is a full-time secretary, a part-time librarian, seven full-time teachers, one part-time teacher, and a custodian. Consultants in each subject area, plus a school psychologist, a social worker, and a nurse, are available through Central Office. The staff is primarily female, with the exception of the Learning Center teacher, the grade six teacher, and the principal. They range in age from 26 to 39, with most people in their early thirties.

Atmosphere. The principal sets the tone of the school. He is an efficient, friendly, middle-aged man who believes in old-fashioned discipline and formal student-teacher relationships. He is skeptical of change for the sake of change, and he is concerned with student learning. He is fairly cooperative, but not highly supportive of teacher-originated suggestions.

The staff is dedicated, but feels overworked. They are a close-knit group. They use traditional methods of teaching, but are always interested in new gimmicks that will fit into their lessons.

On the whole, the atmosphere of the school is casual and friendly, but disciplined and orderly.

Procedures

Please consider this a real situation. Plan as if these lessons were going to be the first serious business after you meet your new class.

Explain exactly what you will do with pupils and materials to be used in your lessons. Feel free to mention particular pupils if necessary. Nothing will be assumed to happen unless you state it in your plans.

If your plans are contingent on some unknown information, first try to obtain the information. If it is unavailable, simply state the contingency and plan your lessons around it.

Take advantage of any sources of information to which you have access. Information which you would obtain from people in the school itself can be obtained from the researcher.

The format to be used in planning your lessons is your own. Use whatever you can teach from.

It will be helpful for you to keep note of your thought processes and procedures as you plan. These will be used in later descriptions of your planning processes.

MATERIALS DISTRIBUTED

Pupils' Cumulative Record Data

NAME	AGE	GMR-C[1] %ILE	GMR-V[2] %ILE	HOME CHARACTERISTICS	MEDICAL HISTORY	PARENT OCCUPATION
Danny	7.2[3]	90	85			plumber
Bonnie	7.6	65	60			teacher
Peter	8.2	85	55	German spoken		carpenter
Eddie	8.0	55	80			salesman
Andrew	7.10	45	55		asthma	stenographer
Susan	7.8	70	75			accountant
Perry	7.3	55	40			housewife
Adele	7.11	20	30			mailman
Lynn	8.1	30	45			salesman
Della	7.5	80	70			dentist
Lori	7.11	5	35			janitor
Randy	8.0	85	85			construction
Michelle	8.1	50	35			psychologist
Joel	7.4	70	85			machinist
Christina	7.8	60	80			store manager

---

[1] Gates-MacGinitie Reading Test: Comprehension score, percentile rank.

[2] Gates-MacGinitie Reading Test: Vocabulary score, percentile rank.

[3] Age given in years and months.

Outline of Earlier Lesson on Description

December

Descriptions of fall, winter, spring, and summer

The teacher had a colored transparency for each of the four seasons. Children sat on the floor around the overhead projector and responded in turn to the teacher's questions.

Fall

1. What colors do you see in the fall?

   Children's answers:
   - green
   - red
   - brown
   - cherry
   - scarlet
   - yellow
   - yellowish-greenish
   - brownish-yellowish
   - violet
   - orange

2. What sound do leaves make in the fall?

   Children's answers:
   - crunching
   - tch-tch-tch
   - crushing
   - crackling
   - kkk-kkk
   - squashing

Winter

1. What is the weather like in the winter?

   Children's answers:
   - cold
   - foggy

frozen
chilly
wind blows
snowy
snow gets in your face

2. What do you feel when you come in from the cold?

Children's answers: warm
cozy

3. What kind of clothing do you wear in the winter?

Children answered in short, complete sentences.

Spring

1. What happens in the spring?

Answers: tiny leaves start coming out
bees start coming out and make honey
flowers
trees start growing
mother cow starts having her babies

Summer

1. What happens in the summer?

Answers: trees are more greener than the other tree
there's more leaves
you can go swimming
you can go outside instead of inside

Assignment

Write a story pretending you are a tree. Tell what you see and hear in winter.

Chrismas Eve

I was could. I mean really
Could I heard somthing
Why it is Santa. Hohoho
ding a ling. I saw him
go past me. I wondrd if
he would leve me any
thing I went to slep
I woke up ther were some
presints I opnd them and
went to slep

The End

by Susan

a little dear

Once upon a time there was a little tree and he saw another little tree and the tree had sum decorations on the tree and he hird a hohohoho! happy christmas and the tree had sum decorations on him and the little dears lived happy every afterand the little trees got mered.

the End

Bonnie

A Winter TREE that got burnt

It was a cold winter day,
it was Christmas Eve the Davd's
family was having funplaying out in the
snow. I was haveing funto last
night I saw Santa Claus.
Comeing with his raindeers.
O no! help I'm burning
and I'm hot I'd better call the
squrrils and that is why
I called the burnt
tree.

the END

by CHRISTINA

If I was a Tree. The End
if I was a Tree
I would See every Thing
arund me. And I would See
Santa Claus go by. and I
would hear the wind blow. And
I would hear people walking by.
People will See me. And people
will look out the window. And
I will see them. I will See the
lights go on and of. I will See
and hear things. I will See
the Christmas lights. and
the Christmas lights will See
me. if It was cold I will be
cold. then I Saw Santa Clause.
and I was very happy.
Santa Clause Siad HoHoHo the End

the therr

once up on a time I saw two boys came runing up to me and started to clim. then I saw lotes of Christmas lighte and Christmas trees. then I saw Santaclaus and his reindeers.

The End

Perry

The Tree and Children in the wintr

onn morning I was playing in my room when I Looked aut the window I saw a tree then I went to my sisters room and said to her I have sene a big tree out side I am going to go and say hello tree wen did uoy come here I was plantd westrda the end

Eddie.

A looking tree,

One Christmas morning a tree was very sad. He wanted someone to play with him. Then a boy was walking. He asked will you play with me. Yes said the boy but first I most go to the store. Oh K but hurry up and then the boy forgot to go back to the tree.

the end.

Michell

I am a tree

On Christmas day there was a tree in our back yard. It was covered with snow. The tree was bigger than the house the boy was thinking how the tree grew so fast.

Randy

if I was a tree
If it was cold I would be
cold-n or if It was
hot I would look through
The fog to see The
Christmas lights. I would
see red ones and blue ones
and on Christmas night
I saw Santa with his
reindeer. The sled it
was red and he said
to his reindeer to to
go faster.

The End

Joel

LIST OF SLIDES[1, 2]

1 Group responses to teacher questions.

2 Free time activities: globe.

3 Free time activities: "Lost and Found."

4 Free time activities: Susan with viewmaster.

5 Adele at desk, pondering.

6 Seatwork: Michelle reading aloud.

7 Seatwork: Perry writing at desk.

8 Free time activities: bookshelves.

9 Bonnie observing Randy.

10 Joel, Bonnie, and Randy at work.

11 Joel showing Bonnie his work.

12 Seatwork: Michelle reading Della's paper.

13 Seatwork: everyone working individually.

14 Listening: Christina, Randy, Adele.

15 Randy protecting his work from ~~Perry~~; reading table in background.

16 Adele at desk, close-up.

17 Danny printing a story at desk.

18 Andrew watching Christina writing.

19 Peter and Christina; Andrew.

---

[1] Although names of children are included in these descriptive titles, only Adele and Eddie were identified when subjects were shown the slides.

[2] Copies of the slides used in this study are available from the author or from the Chairman of the Thesis Supervisory Committee.

20 Perry listening to teacher directions.

21 Eddie and class.

22 Eddie at work during a lesson; Danny distracted.

23 Seatwork: Eddie and Danny each at work.

24 Perry standing, talking to Eddie; teacher's desk in background.

25 Peter conferring; Danny distracted by Eddie.

26 Eddie at work, half-standing at desk.

27 Christina examining someone else's work.

28 Susan and Della examining bulletin board.

29 Uncle Wiggly board game: girls' move.

30 Susan refusing to share the viewmaster with Christina.

31 Uncle Wiggly board game: boys' move.

32 Seatwork: Christina at desk, working; bulletin boards in background.

33 Christina in coat area.

34 Randy and Joel at a board game.

35 Seatwork: Christina working at desk.

36 Christina reading.

37 Susan and Christina talking.

38 Christina and Lori playing game.

39 Seatwork; bulletin board in background.

40 Susan sharing something with Christina and Peter.

41 Adele with friend, Lynn.

42 Individual activities; Joel wandering around the classroom.

APPENDIX B:

THE COMPUTER-ASSISTED PLANNING ANALYSIS INSTRUMENT

INTRODUCTION TO THE COMPUTER PROGRAM

An Overview of the Program

You are going to be asked to recall the thought processes you used in making your curriculum plans. For the purpose of explanation, you will be asked to dissect the planning process you went through and to explain it as though it had been a step-by-step process. The series of questions which the computer will ask to help you describe your planning procedures is shown in the outline in Figure 1. You will answer the whole series of questions for each step of your planning process.

At (2), (3), (4), and (5) on the outline, you will point to choices displayed on the screen. At (8) or (10), you will be asked to write down your answers on sheets provided.

When you get to question (10), you will have completed the first cycle of questions and you will have described the first thoughts you had when you started making your plans. The program will then cycle you back to question (2) so that you can explain the next developments in your plans. This recycling to (2) will continue until you have finished explaining how you developed your curriculum plans.

Some Details about the Program

Question (1) is preceded by a long introduction and samples of questions (2), (3), (4), and (5).

When you get to question (2), you will begin to describe the first thing you thought about or did when you began making your plans. For example, you may have quietly reflected on how you were going to tackle this assignment, or you may have gone to the library to consult some professional references.

Questions (3) through (5) will ask you to explain and describe further how this initial activity, (for example, reflecting, reading, or whatever), did or did not help you make your plans.

In question (5), you will be asked to characterize the information or ideas you have been describing as either (a) a broadly applicable general consideration about children, or language, or schools, or learning; or (b) some particular characteristic of the pupils or the situation for which you are planning.

There are many kinds of general considerations or particular considerations you might have made. Categories into which they might fall are listed below.

(a) General considerations which apply to many planning tasks:

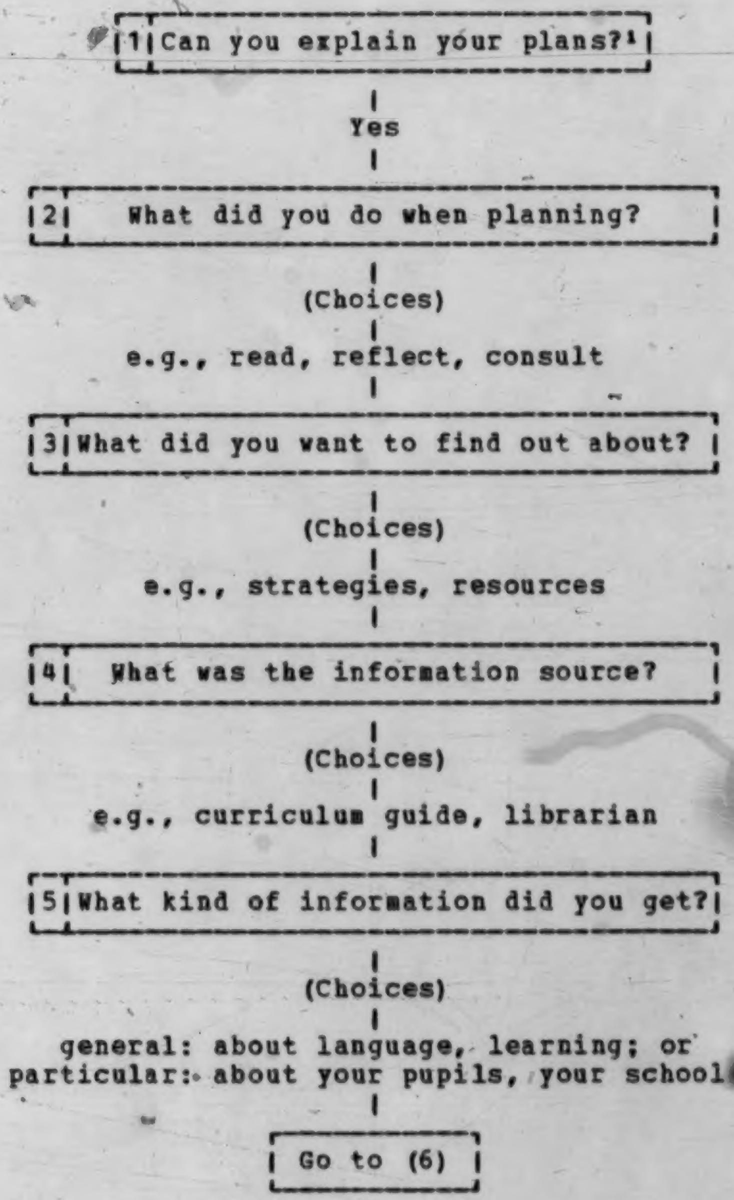
1. the goals schools should fulfill in society;
2. the nature of language competence;
3. how children are influenced by other people;
4. how children grow, develop, and learn;
5. how to plan lessons in general.

(b) Considerations particular to the children and setting for which you are planning:

1. the educational goals of the province or school;
2. the provincial language curriculum;
3. your pupils' family background or peer relationships;
4. your pupils' personal characteristics: cognitive, affective, and psychomotor;
5. what you could do with the materials available, topics for lessons, ideas of things to do.

In what ways do these categories apply to your plans? Some thought given to this question now will save you time when you go through the computer program.

A proctor will be there when you go through the program to answer any questions you might have at that time.



1 Can you explain your plans?[1]

Yes

2 What did you do when planning?

(Choices)

e.g., read, reflect, consult

3 What did you want to find out about?

(Choices)

e.g., strategies, resources

4 What was the information source?

(Choices)

e.g., curriculum guide, librarian

5 What kind of information did you get?

(Choices)

general: about language, learning; or
particular: about your pupils, your school

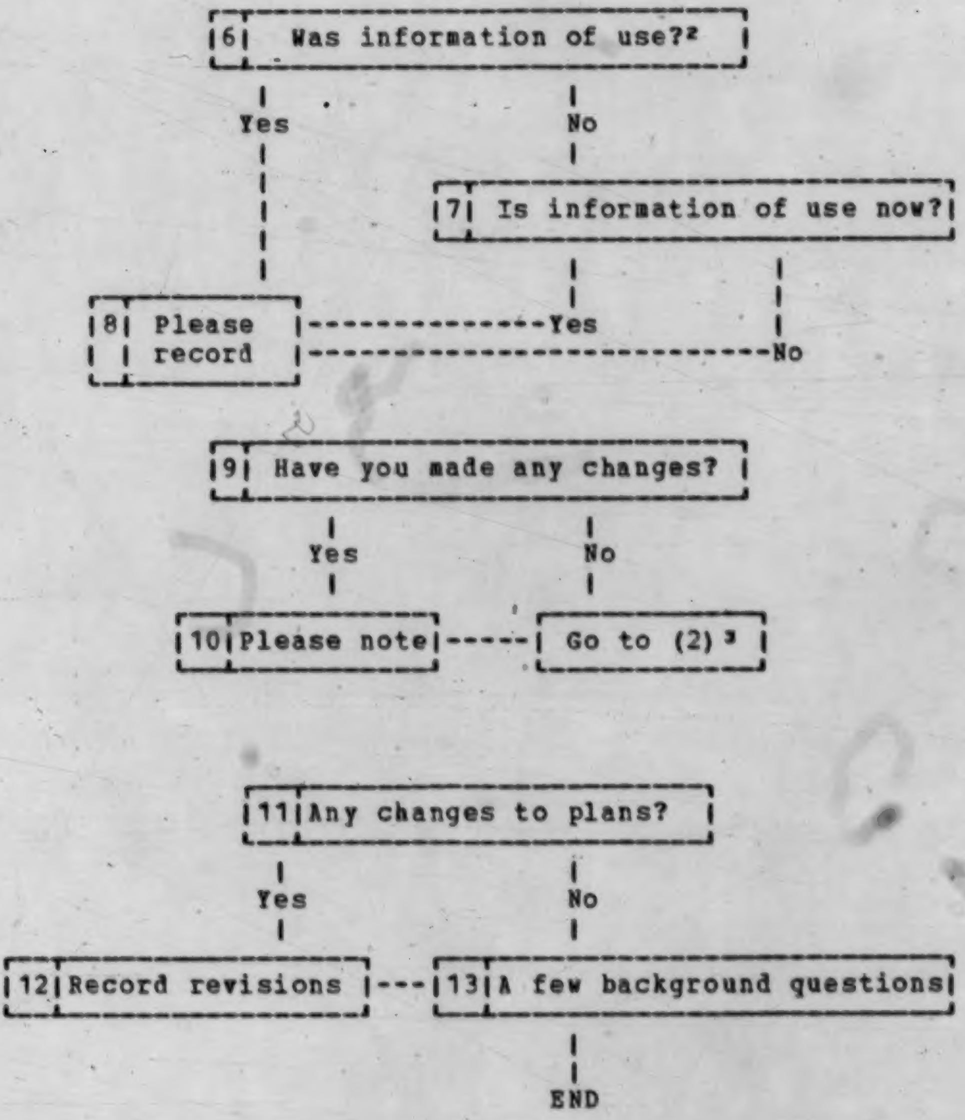
Go to (6)

[1] You will point to an answer for questions (1) to (5).

FIGURE 1

OUTLINE OF THE COMPUTER PROGRAM

(Continued...)

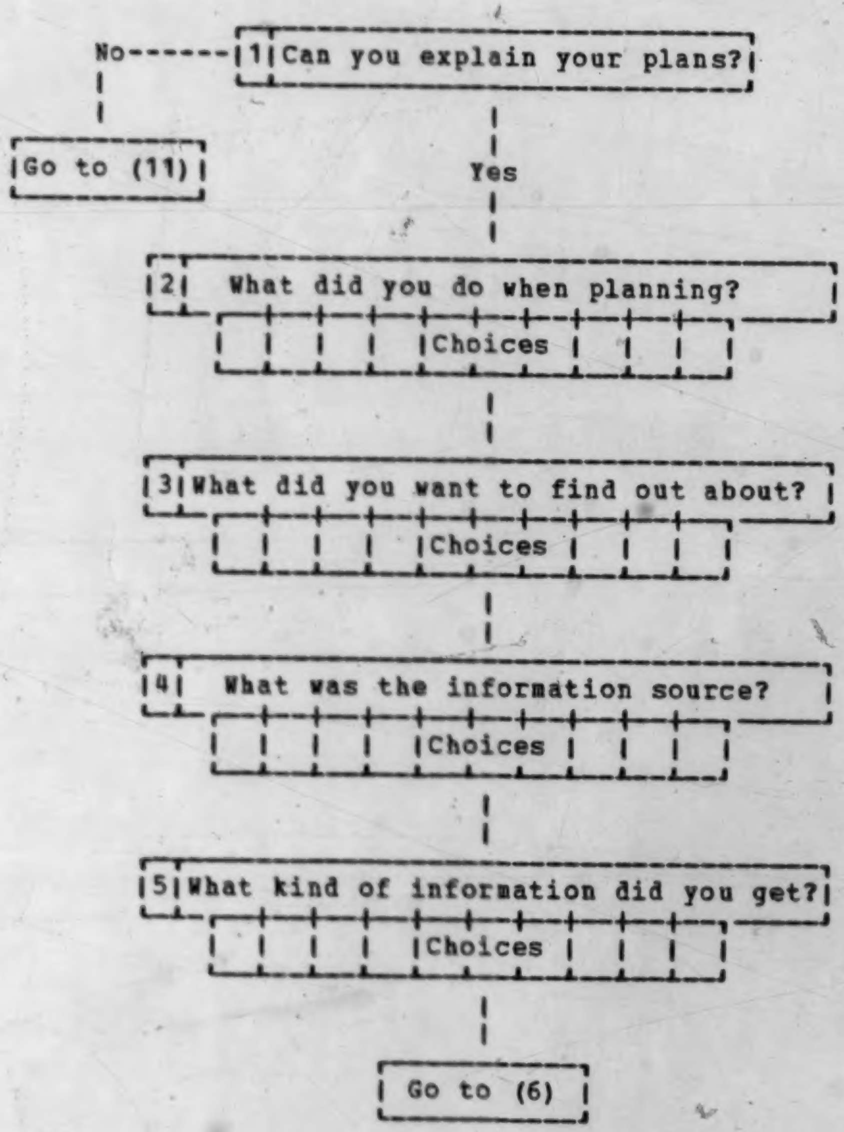

6 Was information of use?[2]
Yes
No
7 Is information of use now?
8 Please record
Yes
No
9 Have you made any changes?
Yes
No
10 Please note
Go to (2)[3]
11 Any changes to plans?
Yes
No
12 Record revisions
13 A few background questions
END

[2] You will write your answers on the forms provided for questions (6) to (10).

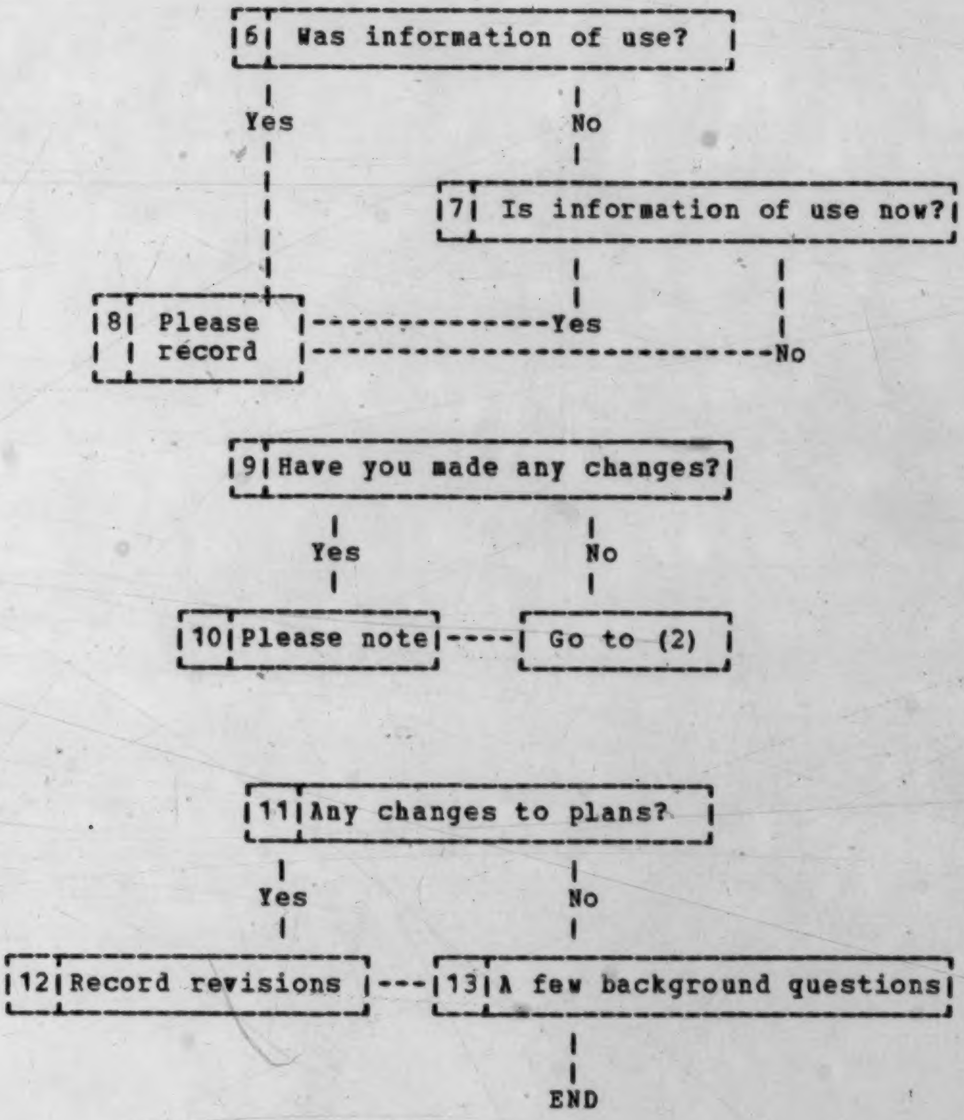
[3] You will go on to explain the next step in your planning.

FIGURE 1 (CONTINUED)

FLOWCHART OF COMPUTER PROGRAM LOGIC


No
1 Can you explain your plans?
Go to (11)
Yes
2 What did you do when planning?
Choices
3 What did you want to find out about?
Choices
4 What was the information source?
Choices
5 What kind of information did you get?
Choices
Go to (6)

(Continued...)


6 Was information of use?
Yes
No
7 Is information of use now?
Yes
No
8 Please record
9 Have you made any changes?
Yes
No
10 Please note
Go to (2)
11 Any changes to plans?
Yes
No
12 Record revisions
13 A few background questions
END

RECORD FORM AND REVISED RECORD FORM

RECORD FORM

Terminal No. ___

Piece of information	Aspect of planning or plans to which it applies	M

REVISED RECORD FORM

Terminal No. ___

O or R	Plans

DEFINITIONS OF CURRICULUM CATEGORIES

Instructional resources - materials, equipment, facilities, to be used by students and/or teacher during the lessons.

Objectives - statements of what it is hoped the students will learn, cognitive, affective, or psychomotor, as a result of the lessons.

Curriculum content - the concepts, ideas, and skills, cognitive, affective, and psychomotor, to be taught, and how they will be organized.

Strategies - what will be done by students and teacher, including how they will be organized, during the lessons.

Pupils - students' interests, skills, knowledge, attitudes, previous experiences, home environments, personalities, peer relationships.

Myself - your [the teacher's] experience, interests, time, abilities, freedom, role, values, and teacher preparation.

Evaluation - procedures for checking whether or not and to what extent your intentions for the lessons have been accomplished.

Lesson planning - definitions and descriptions of a plan, what to include, what to consider, and where to begin.

Something else - there is no expansion for "Something else." You will be asked to type what you found out about.

DEFINITIONS OF THEORETICAL AND PRACTICAL INFORMATION CATEGORIES

Theoretical Kinds of Information

The Goals Schools Should Fulfill (Philosophical)

This refers to information about the function of schools in society; what kinds of goals education should fulfill, societal or individual; and about the role the school should play in the community.

What Constitutes Language Competence (Philosophical)

This category includes information about language growth patterns; about what constitutes language competence, and how it should be taught.

How Social Setting Influences a Child (Sociological)

This refers to information about how a child is influenced by his peers, both at home and at school; about how children generally behave in various kinds of task-oriented groupings. It also includes information about how a child can be influenced by his family and home environment.

How Children Usually Grow and Develop (Psychological)

This refers to information about principles of learning and motivation; what reserachers have found about how children learn, and strategies by which a teacher can contribute to that learning. It also includes information about characteristics typical of children at various levels: interests, capabilities, skills, and knowledge.

How Lessons Should Be Prepared (Curriculum)

This refers to definitions and descriptions of the parts of a lesson plan, what to include, what to consider, and where to begin. It includes information on the characteristics of good plans. It refers to the place of the school system in determining curriculum. It also includes information on the role of the teacher in curriculum development, how much autonomy a teacher should have in the classroom.

Practical Kinds of Information

Language Arts or the Official Aims of Education in the Province (Philosophical)

This category includes the official aims of education in the province of Alberta; the official Alberta language curriculum; the attitudes of the community, especially parents, toward the schools; important ideas and skills in language; teaching descriptive language.

Your Pupils' Family Background or Peer Relationships (Sociological)

This includes your pupils' relationships with friends or classmates; your pupils' family situation and cultural environments.

Your Pupils' Personal Characteristics (Psychological)

This includes your pupils' abilities, physical, mental, and psychomotor; your pupils' knowledge from past experiences or previous learnings.

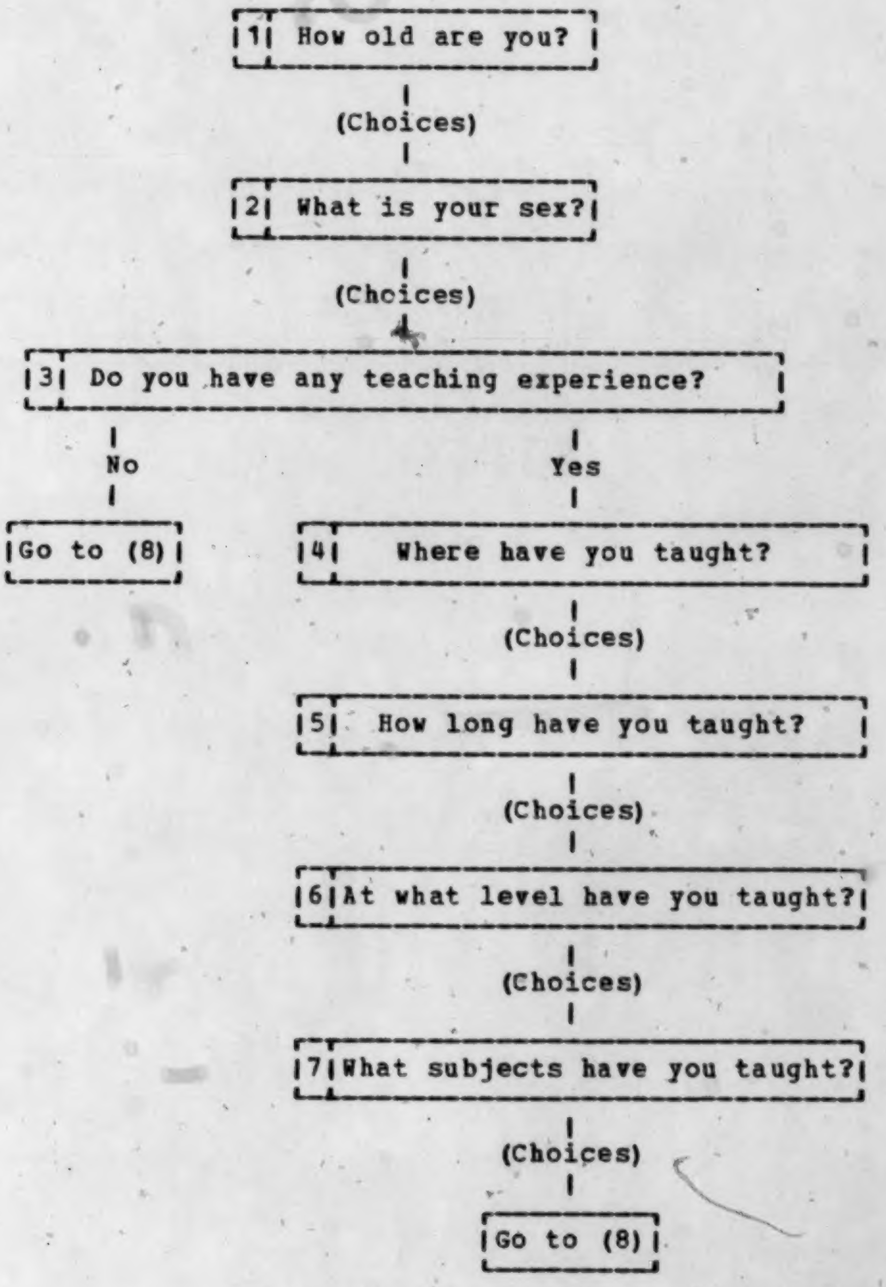
The Setting: Facilities, Organization, and Resources Available (Curriculum)

This refers to the availability of materials; the school's organization; school or classroom atmosphere.

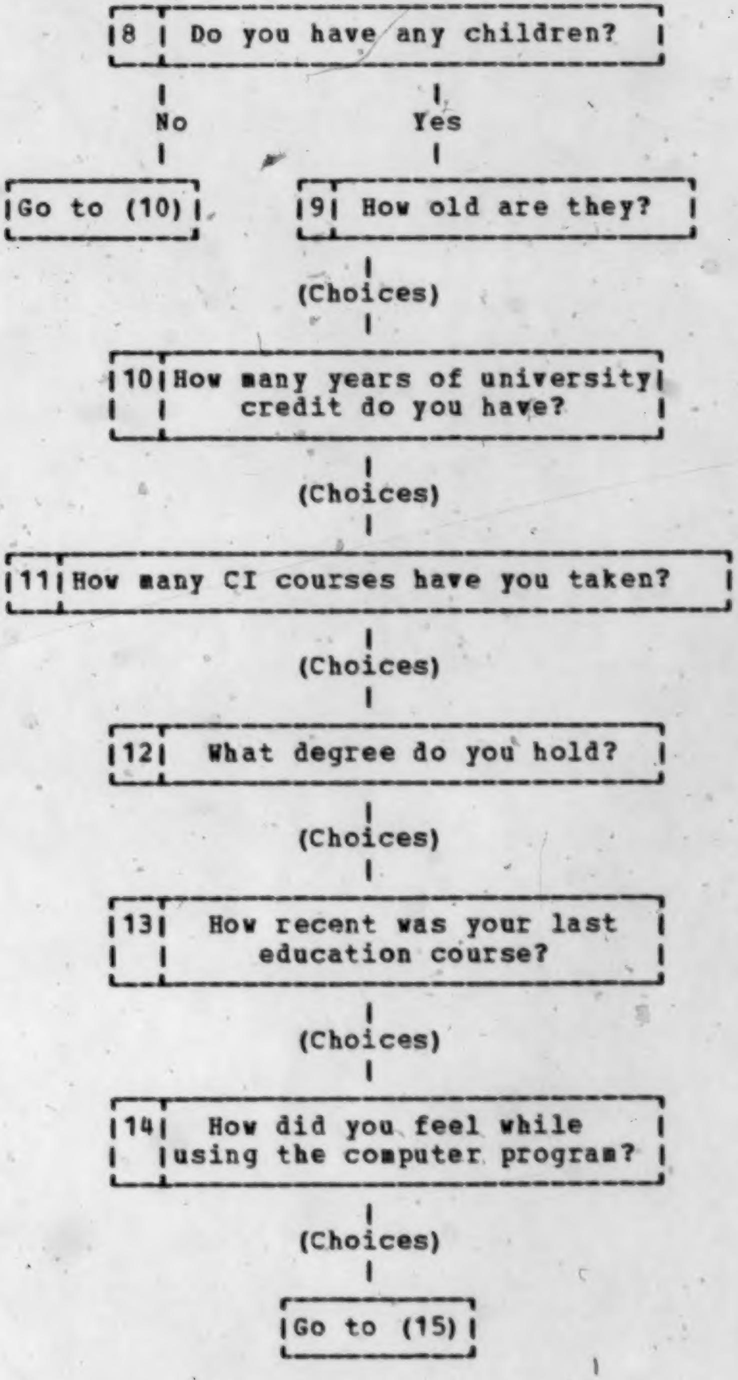
Your Own Personal Characteristics (Curriculum)

This refers to your background, training, or expertise; your interests, talents, or inclinations; your official role as a classroom teacher.

FLOWCHART OF BACKGROUND QUESTIONS


1 How old are you?
(Choices)
2 What is your sex?
(Choices)
3 Do you have any teaching experience?
No
Go to (8)
Yes
4 Where have you taught?
(Choices)
5 How long have you taught?
(Choices)
6 At what level have you taught?
(Choices)
7 What subjects have you taught?
(Choices)
Go to (8)

(Continued...)


8
Do you have any children?
No
Yes
Go to (10)
9
How old are they?
(Choices)
10
How many years of university credit do you have?
(Choices)
11
How many CI courses have you taken?
(Choices)
12
What degree do you hold?
(Choices)
13
How recent was your last education course?
(Choices)
14
How did you feel while using the computer program?
(Choices)
Go to (15)

(Continued...)

15 How satisfied are you with your performance?

(Choices)

16 Have you experienced a similar task?

END

APPENDIX C:

INSTRUMENT FOR THE ANALYSIS OF WRITTEN CURRICULUM PLANS

FORM FOR ANALYSIS OF WRITTEN CURRICULUM PLANS

I. Internal Consistency

A. Completeness

1. Are the following present in the plan?

	YES	NO
objectives	☐	☐
resources	☐	☐
strategies	☐	☐
content	☐	☐
evaluation	☐	☐

2. Are these explicitly stated?

objectives	☐	☐
resources	☐	☐
strategies	☐	☐
content	☐	☐
evaluation	☐	☐

B. Consistency

1. Do the activities suggested contribute to intended learnings?	☐	☐
2. Does the planned evaluation relate to suggested activities?	☐	☐
To intended objectives?	☐	☐

II. Inter-lesson Consistency

A. Continuity

	YES	NO
1. Is one lesson related to the next in terms of any of the following: objectives, activities, evaluation?	☐	☐
2. Are the elements of one lesson, for example, objectives, activities, evaluation, reinforced in any way in the next lesson?	☐	☐

B. Progression

1. Does each lesson make successively greater demands on the learners?	☐	☐
2. Are the lessons consistent with developmental characteristics of learners as well as logical in their progression?	☐	☐

III. External Situational Consistency

A. Philosophical

	YES	NO
1. Are plans congruent with stated goals of education in the province?	☐	☐
2. Are plans in accord with the provincial language curriculum?	☐	☐
3. Do plans address the task of description appropriately?	☐	☐

B. Sociological

1. Do plans show consideration of any characteristics of learners' family backgrounds?	☐	☐
2. Do plans utilize dynamics of learners' peer relationships?	☐	☐
3. Do plans attend to initial student-teacher relationships?	☐	☐

C. Psychological

1. Are plans appropriate to learners' previous experience and knowledge?	☐	☐
2. Are plans appropriate to learners' level of physical and mental development?	☐	☐
3. Are plans appropriate to learners' level of social and emotional development?	☐	☐
4. Do plans utilize learners' interests?	☐	☐

D. Curricular

1. Are plans feasible with materials and facilities available?	☐	☐
2. Do plans utilize appropriate available resources?	☐	☐

IV. External Theoretical Consistency

A. Philosophical

	YES	NO
1. Are plans consistent with an accepted view of the appropriate function of schools in society in this province?	☐	☐
2. Are plans congruent with the structure and method of language learning which underlie language arts in the elementary school?	☐	☐

B. Sociological

1. Are plans consistent with aspects of peer interaction typical of learners at this age level?	☐	☐
2. Are plans consistent with principles of small group interaction?	☐	☐

C. Psychological

1. Are plans consistent with appropriate principles of learning?	☐	☐
2. Are plans consistent with appropriate principles of growth and development?	☐	☐

D. Curricular

1. Do plans include objectives, learning activities, and evaluation measures?	☐	☐
2. Are the plans internally and externally consistent?	☐	☐

GUIDE FOR USING "ANALYSIS OF WRITTEN CURRICULUM PLANS" FORM

Please make sure the number of the plans being evaluated is in the top left corner of the analysis form. This will be a single letter followed by a three-digit number.

The following guidelines are elaborations or references to be used if necessary in judging written curriculum plans according to the "Form for Analysis of Written Curriculum Plans."

Each subject's plans consist of a detailed single lesson plan and an outline of follow-up lessons. If the information provided in all the plans is insufficient to enable judgment on any question, put "Inc" next to the Yes/No boxes after that question. If there is evidence in the plans of awareness of any of the guidelines given for a question, that question should be answered "Yes."

The numbering used in the outline in this Guide corresponds to that used in the plan analysis form.

I. Internal Consistency

A. Completeness

1. Is it evident that consideration has been given to the elements listed, however labelled or not labelled, in the plan? For example, there may not be a part of the plans labelled "strategies," but a description of teaching strategies may be included. In this case, the answer to the question would be "Yes." Conversely, there may be part of the plans labelled "evaluation," but no description of the nature and purpose of the evaluation procedures to be carried out. In this case, it may be said that some consideration has been given to evaluation, but it is not explicit. The answer to this question should be "Yes," but the next question (I.A.2.) should be answered "No." A list of definitions of the parts of a plan to be identified is given on page 6 of this Guide.

2. Are objectives, content, etc. labelled as such in the plan and are these labels appropriate? That is, is the part of the plan labelled "content" actually lesson content? If labels are not present and correct, the answer to this question should be "No." Refer to definitions on page 6. An objective such as "to increase students' powers of description" is too vague to be considered explicit.

B. Consistency

1. Are students given the opportunity to engage in activities which contribute to the major objective of the lesson? For example, if the objective involves oral language, are students engaged in discussion or talking? If the objective is to develop descriptive language, are students given the opportunity to describe something?

2. Does the evaluation focus on learnings students have had the opportunity to acquire during the lesson? Is the evaluation an assessment of the objectives as stated? If there is no evaluation included in the plans, "Inc" should be used after both of these questions.

II. Inter-lesson Consistency

A. Continuity

1. Do succeeding lessons deal with the same overall content as did previous lessons, although perhaps in differing forms or settings?

2. Is there any reference to elements of previous lessons in follow-up lessons?

B. Progression

1. Do demands made on learners increase in terms of the amount, complexity, and difficulty of the learnings intended and activities included?

2. Are there sufficiently small increments in the extent and complexity of intended learnings and activities from one lesson to the next? If lessons differ in the mode of language used, is the progression from oral to written language or from receptive (listening, observing) to expressive (speaking, performing) skills?

III. External Situational Consistency

A. Philosophical

1. See page 7 of this Guide for a listing of the Basic Goals of Education for Alberta.

2. See Principles of the Alberta Language Curriculum on page 8. If plans do not follow the progression from activities to oral language to application of language learned, or if plans include substantial written work in the first lesson, the answer to this question should be "No."

3. Is there some breakdown of the task of description into its simple, prerequisite parts?

B. Sociological

1. Are students' home experiences or family settings used to advantage?

2. Is there any purposefully organized peer interaction for the purpose of instruction instead of just teacher-pupil dialogue or

individual pupil assignments?

3. Is there some reference to the gradual introduction of a new teacher, or to becoming familiar with a new class?

C. Psychological

The students for whom the lessons are planned are a small, heterogeneous group of middle class, suburban seven- and eight-year-olds. Their reading scores on standardized tests range from the fifth to the ninety-fifth percentile. One child is a troublemaker, one is withdrawn, and one is industrious but non-productive. As a group, these children are able to sit still and take turns during a teacher-directed lesson for approximately 20 minutes at a time. The basic guideline for this next series of subquestions is whether or not the children can handle the lesson that is suggested.

1. Is the task of description simplified into its rudimentary components or diagnosis made of students' descriptive powers before students are asked for descriptive statements or compositions? Or are objects and topics used in the lesson familiar to middle class seven- and eight-year-olds? If plans include substantial written work in the first lesson, the answer to this question should be "No."

2. Is the duration of each kind of activity short enough to maintain the interest of bright, active seven- and eight-year-olds? Or is provision made for active involvement on the part of the students? Or is the task mechanically and intellectually simple enough for average seven- and eight-year-olds? If plans deal with abstract ideas or with objects removed from the students' immediate experience, the answer to this question should be "No."

3. Is there provision for participation on the part of all students? Or are tasks and directions simple and explicit?

4. Examples of students' interests might include games, sports, Christmas, peers, all forms of recreation, animals, toys, anything in children's immediate experience, such as weather, school, family.

D. Curricular

1. Materials and facilities available are those found in a typical, well-supplied elementary school or able to be supplied by the teacher.

2. Is the stimulus familiar, concrete (tactile or visual) or colored?

IV. External Theoretical Consistency

B. Philosophical

1. Refer to your own knowledge.

2. A summary of Language Growth Patterns is included on page 9 of this Guide.

B. Sociological

1. Refer to Relevant Principles of Sociology on page 10 of this Guide.

2. If plans are teacher-oriented or teacher-directed, the answer to this question should be "No."

C. Psychological

Refer to Relevant Principles from Psychology on page 11 of the Guide.

D. Curricular

Refer to all previous parts of the analysis form.

1. If the answer to any part of question I.A. was "Yes" for objectives, strategies, and evaluation, the answer to this question should be "Yes."

2. This is an overall assessment of the plans.

Definitions of the Parts of a Plan

Objectives--statements of what it is hoped students will learn, cognitive, affective, and psychomotor, as a result of the lessons. Synonyms include "aims," "goals."

Resources--materials, equipment, or facilities to be used by students and or teacher during the lessons. Synonyms include "materials."

Strategies--what will be done by students and teacher, including how they will be organized, during the lessons. Synonyms include "methods," "activities," "steps," "procedures," "lesson," "organization," "task," "progressions."

Content--statements of the learnings, cognitive, affective, or psychomotor, students will need in order to fulfill the objectives of the lessons. Synonyms include "skills," "topic," "theme."

Evaluation--procedures for checking how well and to what extent the objectives of the lessons have been accomplished. Synonyms include "analysis," "criteria," "feedback," "outcomes."

Goals of Basic Education for Alberta[1]

Skill Competencies

- communication (including literacy and numeracy)
- self expression
- critical thinking
- organizing

Knowledge Competencies

- knowledge of the past and the associated sense of belonging
- knowledge of the present and the associated sense of community
- knowledge of the future and the associated sense of responsibility

Personal Development

- positive self-concept
- feeling of belonging to a family, community, nation

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[1] Goals of basic education I-XII. Final preliminary draft. Edmonton, Alberta: Alberta Department of Education, 1974.

Principles of the Alberta Language Curriculum[2]

The language a child brings from home is intimately bound up with his self-concept and should be accepted and respected.

The language a child brings from home is the initial vehicle for his language development.

The school program should expand a child's language by providing language resources and developing language forms appropriate to many different situations.

Language is built on experience.

Talk is essential to language development.

Language is expanded through active involvement.

Language should be judged for its appropriateness to the situation rather than for its grammatical precision.

Language is used for communication, for personal and social development, and to facilitate thinking.

Children should be helped to develop multi-media literacy.

All language arts processes are interrelated and should also be integrated with other subject areas.

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[2] Elementary language arts handbook. Interim edition. Edmonton, Alberta: Alberta Department of Education, 1973.

Language Growth Patterns[3]

Fluency in communication is a prerequisite to controlled communication.

Physical action precedes oral communication, which in turn develops before written expression.

Attention is often centered on specifics before arriving at generalizations, which in turn are appropriately applied.

Simple structures must be understood before complex structures.

Understanding of the concrete generally precedes an understanding of abstractions.

Growth takes place from one level to multi-level control of the receptive and expressive aspects of language.

The implicit language of the ego-centric child precedes the explicit language of the child who can recognize communicative needs of others.

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[3] Elementary language arts handbook. Interim edition. Edmonton, Alberta: Alberta Department of Education, 1973.

Relevant Principles of Sociology

Children should be grouped and regrouped for learning often and on varying bases.

Unless groups are established for a specific purpose, they are optimally voluntary, small, and homogeneous in terms of students' sex and socioeconomic status.

Democratic classroom leadership style is preferred to an autocratic style.

There should be opportunity for each child to succeed at any set task or to receive recognition during or as a result of the lesson.

Rewards provided are most effective when they are concrete and immediate, and intrinsic where possible.

Rewards should be equally available to all students.

Relevant Principles from Psychology

The range and type of acceptable learning outcomes must be broad in order to accommodate differences in individual pupils.

Learning activities which approximate life-like situations facilitate transfer of learning.

A child should have a fair chance of succeeding at any new task based on his previous learnings.

Young children should be given concrete materials to manipulate.

Materials or processes to be learned should be developed in some logical sequence.

Materials and modes of presentation must be varied in order to accommodate differences in learning styles among pupils.

Active involvement in the learning activity by all students facilitates learning.

The pacing of learning must be flexible enough to allow mastery by every student.